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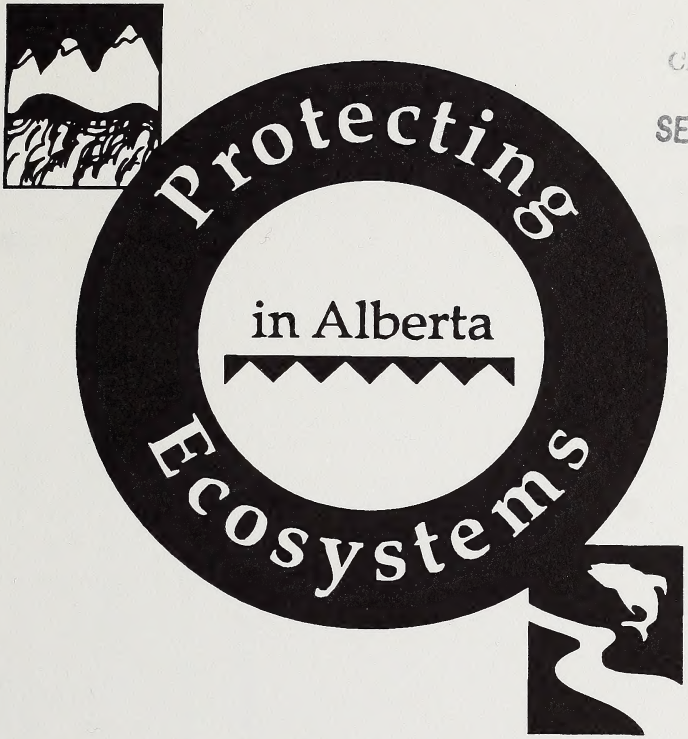

Protecting Ecosystems in Alberta

A Survey of Government Mechanisms

A Discussion Paper Prepared for the
Alberta Conservation Strategy Project

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Page 162 of *Protecting Ecosystems in Alberta: A Survey of Government Mechanisms*

The following data should be added to Table E-1 after the listing for Willmore Wilderness Park:

6641	National Park	Banff	**Rocky Mountain:** Montane & Subalpine/Alpine
10878	National Park	Jasper	**Rocky Mountain:** Subalpine/Alpine
35845	National Park	Wood Buffalo	**Boreal Forest:** Subarctic, Hay River & Peace R. Lowlands

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Protecting Ecosystems in Alberta: A Survey of Government Mechanisms

Prepared by
Susan Bramm

Sponsored by
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with funding assistance from
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2. Biodiversity, Alberta
3. Wilderness, Alberta
4. Natural Regions, Alberta
5. Land Management, Alberta

ABOUT THIS DISCUSSION PAPER

Alberta is world-renowned for its Rocky Mountain wilderness. Less known and appreciated is the province's vast array of natural life and landscapes. The Rocky Mountains, about 7% of the province's area, comprise only one of six major "natural regions" in Alberta. The others are: Grassland, Foothills, Parkland, Boreal Forest and Canadian Shield. The natural regions are divided into 17 subregions, each with a variety of locally distinct landscapes and biological communities.

Alberta is a patchwork quilt, consisting of "original pieces" (areas that support representative natural ecosystems) and areas transformed or completely changed by human activity. The purposes of this report are to (1) take an inventory of government mechanisms that protect those "original pieces," or at least restrict human impact on them, and (2) determine how Alberta's 17 natural subregions are represented by areas designated under these mechanisms. A comprehensive inventory of this type has never been done.

I hope this report will help you understand more about the natural ecosystems of Alberta, and how the federal and provincial governments can provide for their existence in Alberta's landscape. I hope that it will serve as a catalyst for you to participate in realizing Alberta Conservation Strategy objectives.

Protecting Ecosystems in Alberta begins by discussing why protection of examples of natural ecosystems is urgently needed. It then describes Alberta's natural regions and other factors contributing to the complexity of the province's endemic ecosystems, followed by an overview of land management systems in the province and how protection or restriction is designated. Provincial and federal government protection mechanisms as well as international designations are thoroughly explored. Finally, conclusions are drawn concerning the current and future status of native ecosystem protection in Alberta.

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The Environment Council of Alberta facilitated the editing, final production, printing and distribution of this report. The support and hard work of Elizabeth Alke and Cal Webb of the ECA were critical to the completion of this project. Special thanks to Barbara McCord for editing.

This project has given me an immense appreciation for the marvelous biodiversity in Alberta and the many efforts that have been made to set aside and protect representative examples of this priceless diversity. I have endeavored, within the constraints of time, resources and available information to present consistent, accurate and up-to-date information. And it's but a beginning...

Susan Bramm
June 1992

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Chapter 1

Introduction

No one disputes that the human race has demonstrated an awesome power to transform the planet we call home. It is evident almost everywhere we look. Urbanization, transportation, development of Alberta's natural resources (soils, forests, oil, gas, minerals, water and air), recreation and tourism, and industrialization have transformed the province into a landscape quilt. Some parts of the quilt are "pieces of the original" (Pachal 1992), supporting samples of natural ecosystems (the physical environment and all the organisms and their interrelationships associated with that environment) whose complexity and biodiversity have hardly changed in hundreds of years and where humans play an insignificant role. Biodiversity, or biological diversity is defined as:

> *...the variety of the world's plants, animals and other organisms, including the genetic variation and the ecological complexes in which they live (International Union for Conservation of Nature and Natural Resources, IUCN, as quoted in Posey 1992: 2).*

Other parts of Alberta's landscape support loosely managed, yet simplified biological systems, including the 77,496 square kilometres (km^2) of grazing land throughout Alberta (Canada Census 1986) and 38,100 blocks of rejuvenating or replanted forestlands totalling 67,325 km^2 (Branter 1991: pers. comm.). Yet other pieces are more intensively managed, notably the 129,065 km^2 of cultivated farmland including 4,437 km^2 of irrigated lands in southern Alberta (Alberta Agriculture 1990). And then there are urban pieces, which in their most highly developed state, have just as much or more land surface covered by man-made materials as living organisms. More than 3,050 km^2 of Alberta is designated as villages, towns and cities (Miller 1991: pers. comm.) and 3,526 km^2 is taken up by roads (Alberta Transportation 1991: pers. comm.). These activities and land uses have affected more than 40% of Alberta – there are many other activities and land uses that have not been included.

The history of this planet indicates that in most cases, human-directed development has replaced complex "original" biological systems with much simpler ones (Koshland 1991; Erwin 1991; Morowitz 1991). There would be less cause for alarm if Alberta were homogeneous from north to south and east to west. But that is far from the case. Alberta has a wide range of natural environments. Scientists (Alberta Recreation and Parks (1979a); Spalding 1980; Strong and Leggat 1981) have distinguished six major types: grassland, foothills, rocky mountains, parkland, boreal forest (northern forest) and Canadian Shield. These can be further distinguished into a total of 17 "natural subregions" of the province (see Chapter 2), with different local landscape characteristics adding further complexity.

Protected Areas in Alberta

Protecting Ecosystems in Alberta describes a spectrum of almost 30 federal and provincial government mechanisms, focusing primarily on legislation, regulation and policy, which have been used (or could be used) to designate a wide range of protected areas in Alberta.

Protected areas are representative examples of Alberta's natural ecosystems (distinct and diverse assemblages of indigenous plants and animals and unique landscapes) guarded from human domination, alteration or interference that could significantly change their composition and processes. They range from large tracts of wilderness to small parcels that may have been partially disturbed by human activity, from those with no access to those with restricted yet intensive facility development and recreational activity. In most cases, commercial resource activities such as forestry, agriculture, mining, and oil and gas development are prohibited (Canadian Environmental Advisory Council 1991).

This discussion paper provides an inventory of Alberta's protected areas and a preliminary assessment of their representation of Alberta's natural diversity, using the 17 natural subregions as a basis for comparison.

The adequacy of representation is related to a number of other factors, which are beyond the scope of this report, including representation of more than 100 different environmental features; protection of unique sites; and size, configuration and geographic distribution of individual areas (Webb 1987). Further research and consultation is required to refine this assessment and provide the basis for an action plan for protected areas in Alberta. An inventory allows the strengths and shortcomings of the mechanisms and their implementation in Alberta to be identified.

The Canadian Parks and Wilderness Society (CPAWS), Alberta Chapter, initiated this project to provide a basis on which to propose, plan and achieve protection of Alberta's biological diversity.

Establishing and providing protection for a system of representative areas across the province, reflecting the diversity of Alberta's natural ecosystems ensures:

- the long-term perpetuation of indigenous species in their native habitats or environments, and the genetic diversity that they represent
- the continuation of the processes of growth, death and renewal within these naturally evolving land and water environments
- the protection of Alberta's natural heritage, as represented by specific places, landscapes, plants and animals, from simplification, displacement or destruction
- the restriction of human domination and presence in the composition and functioning of representative areas across the province
- the provision of future options for protecting or using these areas.

> *We must protect the earth for, and not from people (Hummel 1989: 273).*

Maintaining and protecting ecological diversity is inherent in three of the six objectives adopted by the Alberta Conservation Strategy (Public Advisory Committees to the Environment Council of Alberta (ECA) 1987). These are:

1. To maintain essential ecological processes and life support systems on which human survival and development depend.
2. To preserve genetic diversity (the range of genetic material found in the province's organisms).
3. To achieve sustainable use of species and ecosystems.

Areas supporting examples of Alberta's natural ecosystems fulfill other important functions, as suggested by another Alberta Conservation Strategy objective: to provide recreational, spiritual, aesthetic and other nonmaterial needs of Albertans.

The protection mechanisms and legislation discussed in this document represent those currently in place to meet these conservation objectives.

The Role of *Homo sapiens* in Alberta's Natural History

The geology and landscapes of Alberta tell a story of amazing changes in climate, land and life: from mile-thick glaciers to shallow seas; from giant, far-roaming dinosaurs to microscopic marine organisms; from lush, tropical forests to cold periglacial deserts.

Human beings have been an integral part of Alberta's evolving ecosystems for more than 30,000 years. Up until the 1800s it was not a dominating role. They coexisted and competed with other predators, such as wolves, cougars, bears and wolverines. None of these summit predators (those at the top of the food chain) were plentiful or powerful enough to eliminate the others.

The humans of North America developed tools and social organizations that enabled them to survive from year to year, generation to generation. For example, Alberta's native people were engaged in communal hunting of bison as early as 10,000 years ago (Helgason 1987). Their success was based on knowledge and respect for the world in which they lived:

> *These bands did not roam haphazardly across the landscape. To do so on the plains could have been suicide. The bands needed to be familiar enough with the habits of the buffalo so that they could intercept the herds by moving into the areas where they were likely to be at certain times. They tailored their movements by the season, journeying to the woods in the winter and onto the plains in summer. (Helgason 1987: 64)*

Although the plains Indians hunted other animals such as elk, antelope, deer, muskrat, beaver and fox, the bison was their most significant prey, providing them with almost everything they needed, from meat (fresh, or dried for later use), to shelter, clothing, containers, cutlery and other tools.

Alberta's native people did not cause major changes in the ecosystems of which they were a part (MacGregor 1972).

The arrival of Europeans in North America in the 1700s, however, marked the beginning of an accelerated change of this continent's ecosystems, aided by the use of firearms and horses. Over a mere 200 years the Canadian prairies have become dominated by humans and by the effects of their activities. In the process of reproducing European models of settlement and society on the North American landscape, many other living components have been reduced, compromised or eliminated and in some areas the landscape of the region has been changed beyond recognition.

The transformation began with extensive harvesting of one of the prairies' largest mammals, the bison (Roe 1951), followed by large-scale cultivation or grazing of the land, based on the belief that it would be immensely productive.

> *...the early European explorers were deeply struck by the natural productivity of the Canadian prairies. The massive herds of bison, the scattered groupings of elk, the ubiquitous pronghorn antelope combined with the packs of prairie wolves and scattered plains grizzly bears left a lasting impression upon these early travellers. Despite the harshness of its climate, the rich prairie soils together with the abundant wild fruits and plentiful wildlife deepened their conviction that this was a land of great endemic productivity (Gauthier and Henry 1989: 183).*

In 40 years the plains bison became extinct in Manitoba and remnant herds were found only in southern Alberta and Saskatchewan. By the early 1870s explorers such as William Frances Butler noted that the vast herds of bison had disappeared, and with them other wildlife such as wolves and bears that had preyed on the bison. The numbers of elk and deer declined after hunters turned to them to replace the bison. As agricultural development proceeded and native habitats were dominated by domesticated animals or eliminated for cultivation, more indigenous animal species disappeared: prairie chickens and pronghorn antelope disappeared from Manitoba and declined in Saskatchewan.

More than 60% of the prairies' wetlands, 1.5 million hectares, have been drained and cultivated (Usher and Scarth 1990), with a corresponding decline of thousands of waterfowl. (The Canadian prairies represent about 60% of the total nesting habitat for all North American waterfowl, and Alberta about 25% of the total, Turner 1991: pers. comm.)

Prairie soils and their natural productivity have also changed—organic matter and biomass have been reduced by 50% since the first land was broken, and modern efforts to replace this loss include heavy use of commercial fertilizers (Gauthier and Henry 1989). Little remains of the endemic prairie ecosystems with their inherent complexity and diversity of species and built-in adaptability to changing environmental conditions.

> *The original stable condition of the soil and grass has given way to an intensively managed, inherently unstable system (Gauthier and Henry 1989: 185).*

Overall, more than 80% of the native prairie landscape has been transformed by agriculture or urbanization (Gauthier and Henry 1989). The amount remaining ranges from almost nothing for the tallgrass prairie to 25% of the aspen parkland (Banks 1990). The loss of native prairie habitat is so serious that several urgent initiatives, public and private, have been launched (see Chapters 4 and 7). Much of what remains is in relatively small parcels deemed marginal for agriculture, associated with wetlands or watercourses, or located in difficult or inaccessible terrain.

The domination of earth's ecosphere (all that supports life) by the human species continues and escalates. Here in Alberta, human activities are infiltrating, fragmenting and destroying areas supporting remnants of Alberta's diverse native ecosystems. For example, almost 400 km^2 of forest land is harvested every year in Alberta (Price 1991: pers. comm.). This will increase significantly in the 1990s with the signing of the Alberta-Pacific (AlPac) Forest Management Agreement. Until now these so-called advances have been made without considering the bigger picture of Alberta, one in which the natural diversity of the province is well represented and protected. This scenario has been repeated thousands of times throughout the world and has reached such proportions that the health and survival of humankind and many other plant and animal species is compromised and even threatened (Webb 1987).

Why Maintain and Protect Examples of Natural Ecosystems?

There are many reasons why areas supporting representative examples of natural ecosystems must be protected now. Many Canadians have clearly articulated them (Hummel 1989; Pachal 1992, Rowe 1990; Sangster 1990). Swinnerton (1991: 27-34) provides a comprehensive discussion of the benefits associated with natural areas including inherent and intrinsic values (termed biocentric); human values (anthropocentric) including spiritual, recreational and aesthetic, ecological, scientific and educational, and cultural and historical; and economic or monetary values.

The Inherent Worth of Earth's Natural Ecosystems

Many people around the world believe that humans have an ethical responsibility, as one creature among perhaps 30 million species (May 1988), to ensure that human endeavour does not compromise the healthy existence of other creatures with whom we share the planet. Flora, fauna, native ecosystems, places—all are diverse threads in the fabric of life; all are worthy of continuance. Norton (1988: 201) says:

> *They are according to this view, valuable in themselves, and their value is not dependent on any uses to which we put them.*

The strong sense of connectedness to all living creatures and places has been expressed by many writers:

> *... when I say that the fate of the sea turtle or tiger or the gibbon is mine, I mean it. All that is in my universe is not merely mine; it is me. And I shall defend myself (Livingston 1981: 113).*

When people begin to so deeply identify with the natural world, their perception is no longer an anthropocentric one, where humans are set apart; but a biocentric one, with *Homo sapiens* as an integral part. For many, this realization marks the beginning of a new sense of respect and caring for all life on this planet, including ourselves.

Biodiversity

Natural ecosystems support the most complex assemblages of plants and animals, consisting of a great variety of organisms that are interconnected within the same environment. Posey (1992) reports that Alberta supports 90 species of resident mammals, 250 of breeding birds, 50 of fish, 8 of reptiles and 10 of amphibians as well as more than 1,700 flowering species, hundreds of other plants and tens of thousands of insect species. Each species exhibits a specific combination of characteristics that allows it to survive and reproduce within a particular range of physical conditions and interrelationships with other organisms in that environment.

Wilson (1989:114) notes the importance of the huge genetic reservoirs harboured by earth's natural ecosystems:

> *Species diversity—or the world's available gene pool—is one of our planet's most important and irreplaceable resources. No artificially selected genetic strain, has to my knowledge, ever outcompeted wild variants of the same species in the natural environment.*

Natural ecosystems propagate and maintain the species best fit to live on earth.

> *These places are absolutely priceless. They contain earth's secrets of life and survival, manifested by natural lifeforms perfected over millions of years of countless trial-and-error evolutionary experiments. Their like will never be seen again should they vanish. We easily erase legions of living masterpieces, but we cannot make a blade of grass (Edwards 1989: 22).*

Estimates of the complete array of lifeforms on the planet vary from 15 to 30 million species (May 1988). Only about 1.5 million species have been described. While in most cases geographic ranges and ecological functions of known species have not yet been determined, the rate of species extinction in the world today is very high, higher than experienced since life began on this planet (Lovejoy 1986).

> *...it has been forecast that between 15 and 20% of all species will march into extinction in the next twenty years, whether or not they are known (Hilts 1989: 100).*

Here in Canada, extinction is of serious concern in those areas that have large-scale and intensive human domination, such as the grasslands and parklands of the prairies. Most extinction occurs through the destruction of natural habitat and fragmentation of habitat into isolated refuges (Vermeij 1986).

Why is maintaining biodiversity so important? It contributes to the stability and functioning of the remnants of natural ecosystems on which all life depends. It represents a reservoir of genetic material that can be tapped to replace or improve species humans use or intensively manage. This is important, considering that fewer than 20 species of plants contribute up to 80% of the world's food supply (Posey 1992). The more diversity that is retained, the better we can adapt to future changes.

This genetic treasure is best maintained as part of the complex living systems in which it has evolved—zoos and seed banks, although valuable, cannot achieve the same result (Posey 1992). The secrets of how life has adapted and is able to adapt to changing global and local conditions are found within these areas. They act as benchmarks, or natural control settings, against which we can predict and measure change.

There are already efforts under way to protect examples of Alberta's natural ecosystems considered endangered, and expensive programs have been instituted for the recovery of individual wildlife species. In the end, protection of larger areas of indigenous life is the most effective and cost-efficient solution.

> *There is a growing realization that while single-salvage operations are urgent, a blanket of protection can be given to a host of creatures through the conservation of large samples of ecosystems (McTaggart-Cowan 1989: 257).*

The general public recognizes that species extinction is unacceptable.

> *Sentiment in Canada is against the extermination of any species of our native flora and fauna. In general, we like to believe that we are clever enough to extract a high standard of living for ourselves without inflicting the final violence on any of the creatures that preceded us on the continent (McTaggart-Cowan 1989: 256).*

Free Ecosystem Services

> *All human beings and human activities are imbedded in and dependent upon the ecosystems of our planet. Ecosystems are the machinery of nature, the machinery that supports our lives. Without the services provided by natural ecosystems, civilization would collapse and human life would collapse and human life would not be possible (Worster 1977: 378).*

For most people, the role and dependency Worster refers to is obscured by where and how they live: in modern cities, making choices that emphasize independence, convenience and economic value. They are unaware that tracts supporting viable examples of natural ecosystems function as "biological substations," providing "services" that maintain and boost the surrounding network of life, and contribute to the well-being of the entire planet.

Such areas maintain many living processes: complicated interactions of plants, animals and microbes (Talbot 1987). In the past, many of these ecosystem services—the provision of food and water and the purification of air, water and land, for example—were taken for granted. But humans have encroached on the natural functioning of these areas and their ability to support life has diminished. Some of this loss has been replaced by expensive, less-effective manmade solutions:

> *Though the costs may be hidden, Albertans are already paying for flood protection and water purification substitutes for natural wetland functions (Usher and Scarth 1990: 24).*

In other cases their contribution is widespread and irreplaceable. For example, they consume carbon dioxide and produce oxygen, and maintain the balance of these and other gases, including ozone; thereby helping to stabilize climates. They provide the mechanisms for the cycling of earth's nutrients and for the recharge of groundwater supplies. Their complex vegetation cover helps to enrich soil and protect it from erosion. They produce nutritious food. Crops are freely pollinated by bees. Their watersheds purify water and hold it for gradual release. The list goes on.

Simplified biological systems, such as areas converted to cultivation, grazing or silviculture can provide some of these benefits, but in a limited way. In many cases so much of the original ecosystem has been destroyed that it cannot function from year to year without constant human effort. Only remnants of continuously evolving indigenous ecosystems of sufficient size and number, can provide these necessities on an ongoing basis.

Nonmaterial Benefits

Driver, Nash and Haas (1987), Pachal (1992), Swinnerton (1991) and others have outlined the myriad of spiritual, social, recreational, educational and cultural benefits of maintaining and preserving areas that exemplify Alberta's natural diversity. Most of these are amenity values—things we prize because they improve "our lives in some nonmaterial way" (Norton 1988: 201).

There are a variety of ways people enjoy and benefit from natural areas, ranging from viewing and listening in their own living rooms through television and audio recordings to direct experience, without protection or convenience of motorized vehicles and modern facilities. Humans seek out natural and wild places to enrich their everyday lives and in many cases, discover the meaning of their lives. People venture out to experience and learn about the diversity of life, beauty, wonder, mystery, God, eternity, oneness, adventure. They go to get away from it all, to get their bearings, to put into perspective their everyday experiences in which humans are at the centre of the world.

Natural places have historical depth and continuity, not only with our distant evolutionary past but also with our more recent national historical past. They offer the opportunity to study and appreciate the results of thousands of years of evolution, including millions of life cycles of birth, growth, death and renewal, and centuries of gradual movement and shifting of earth's landforms.

Canada's relatively young history can be viewed as the record of men and women carving a place for themselves in the wilderness.

> *We in Canada are, in large degree, formed by the wilderness. It has been, through most of our history, our context and—in some cases—our crucible. Our truly native people, the Indians and Eskimos, are people of the wilderness. And we are the spiritual descendants of Etienne Brule and David Thompson, La Verendrye and Simon Fraser, as well as thousands of unsung wilderness voyageurs and frontier farmers. Our cities and towns have only recently, in historical terms, grown from tiny settlements in the bush. The epic features of our national accomplishments have often been achieved against a wilderness backdrop; the French and Indian War, the expansion of the fur trade, Wolseley's march to confront Riel at Fort Garry, the construction of the C.P.R., the drawing together of small provinces into a confederation—provinces separated by vast tracts of mountain, plain and forest. The presence of wild lands has imprinted these events with a special character which is peculiarly Canadian and North American. And the continuing opportunity to experience wilderness—an opportunity that is rapidly diminishing for urban Canadians—aids us in understanding our historical roots and character (Litteljohn 1971: 25-26).*

For most Canadians, experiencing the natural world is part of their upbringing and the memory of these precious, wondrous experiences drive parents and grandparents to repeat these for their children and grandchildren:

> *...somewhere in the heart's memory is a special love of the natural world...Maybe it's a cottage on the lake. Maybe it's a favourite fishing spot or a hunting trip with a father who passed on years ago (May 1989: 85).*

Much of the world's enduring science, art, philosophy and religion has sprung from humans' investigation and contemplation of nature. This is particularly true of Canada's valued culture. About our literature, Kilbourn (1973: 227) quotes critic Northrope Frye:

> *Everything that is central in Canadian writing seems to be marked by the imminence of the natural world.*

Attesting to this is the poetry of Archibald Lampman, Earl Birney and Margaret Atwood; and the prose of Hugh MacLennan, Gabriel Roy and Wayland Drew. Much of Canada's best-loved painting celebrates the wild. Tom Thomson and The Group of Seven painted the rock, rivers, forests and lakes of Algonquin, Algoma and Quebec's Eastern Townships; Emily Carr was inspired by the temperate forests of British Columbia; and Illingworth Kerr captured the light and colour of the wide, wild prairie. Canadians also celebrate this country's wild heritage in world-recognized films and television programs. Art is not the only cultural product inspired by wilderness. Many philosophical treatises have their roots in the contemplation of the wild world. Eastern, Western and Native American religions are wilderness inspired.

Litteljohn (1971) touches on yet another reason for protecting natural ecosystems—it is integral to maintaining the health of the remaining native cultures that once flourished in North America before the white man came. While for nonnatives traditional wilderness pursuits like hunting, fishing and gathering may be part-time recreational activities for natives these pursuits (including trapping) are a way of life. Without tracts of wilderness, there can be little hope that these cultures will survive.

Economic Factors

Natural areas play an important role in Alberta's economy, providing an array of products as well as opportunities for which people will pay money (see Burton 1984; Posey 1992; Pachal 1992; Swinnerton 1991; Webb 1987). Governments and industry have long recognized that natural areas provide tangible products— food, building and clothing materials and thousands of other useful items, such as pharmaceuticals—and have made some efforts to ensure sustainable use. Recently, for example, the pharmaceutical giant Merck & Co. agreed to pay $1 million for the opportunity to screen Costa Rica's unexplored plant and animal species for biologically active components that could yield a host of new drugs. The "hunting fee" paid by the company and royalties received from any products developed from samples taken will be directed toward inventory and preservation of Costa Rica's biological diversity, represented by about a million species (Aldhous 1991).

The world's natural ecosystems continue to supply a significant proportion of all biological products. In Canada there are numerous examples of such products, including wild meat and waterfowl, berries, fish, wild rice, herbs, furs and hides, down from ducks and geese, taxidermy specimens, eggs, various woods for building and paper products, dyes and chemicals used in industry, horticultural species and drugs. It is important to note that our economy is based on a situation that will not exist again. For example, a 500-year-old spruce forest harvested for lumber will be replaced by a managed ecosystem whose trees will be cut in 80 to 100 years.

Natural areas also provide a great variety of recreational opportunities, including active sports such as skiing, consumptive activities such as hunting and fishing, and less-consumptive pursuits such as hiking, canoeing and nature photography (Swinnerton 1991). Recreation and tourism in Alberta's natural areas is growing and competing with longer-established activities of agriculture, forestry, oil and gas extraction, and urbanization (Swinnerton 1991).

It is difficult to assess the real economic value to consumers of recreation and tourism in Alberta's natural areas because many of the benefits are indirect or immeasurable. A minimum annual value is estimated at $500 million, just for wildlife-related expenditures. This is based on consideration of direct or threshold costs such as for equipment, travel, accommodation, meals, user fees, hunting and fishing licences and maintenance of areas and facilities (Swinnerton 1991: 32). For 1984/85, expenditures and economic impacts of use of the provincial park system alone was almost $100 million. (Swinnerton 1991: 33). In 1981, it is estimated that 15.5 million Canadians spent $4.2 billion on a variety of wildlife-related activities, and 1.8 million people spent $1.2 billion on hunting wildlife (Swinnerton 1991: 31).

But as Swinnerton (1991: 30) points out, the market price based solely on such expenditures does not represent the full value of benefits received by visitors or the economy. Some researchers have attempted to account for indirect or secondary impacts by applying a "multiplier," which may almost double the economic benefits. Others have added extra market values based on consumers' "willingness to pay" more than they actually did rather than forego these experiences. But there still remain many benefits that defy monetary valuation. Many of these activities enrich people's lives, making them happier, healthier and more productive members of society. This can have significant indirect economic consequences.

History has already shown that as natural ecosystems and wilderness areas become scarce, they grow in value. This is reflected in the fact that more than 90% of Canadians approve government spending to preserve natural areas of our country, regardless of whether they are used or not (Pachal 1992). Activities such as the Endangered Spaces Campaign of the World Wildlife Fund have received strong public endorsement (World Wildlife Fund 1991). It is also reflected in the fact that nonconsumptive activities such as bird-watching and hiking are on the increase. And it is also revealed by the fact that tourists from outside Canada inject millions of dollars into Alberta's economy to vacation in our natural wonderlands.

Urgency

The dramatic and accelerating degradation of earth's natural ecosystems by humankind has been chronicled in numerous reports and articles (Ehrlich and Ehrlich 1981; Ehrlich 1991; Ehrlich and Wilson 1991; Hackman 1990, World Commission on Environment and Development (WCED) 1987). Countless thousands of species of plants and animals are extinct as a result. We are reminded of our dependence on these ecosystems by indications of significant changes occurring in the planet's atmosphere and weather patterns, soil conditions, water and air quality, and plant and animal health.

Albertans and all citizens of this planet are party to these changes. We have been brought to the paradoxical position that requires that we intervene with mechanisms of our own (see Chapter 4) to reduce, make negligible or eliminate altogether, the human impact on areas supporting the remains of natural ecosystems, and so help to maintain their integral role in the survival of life on this planet.

The vestiges of Alberta's natural ecosystems will continue to diminish in size and integrity as we humans continue to fragment, harvest and transform them into simpler, living systems. Extinction of species is expected to accelerate 40 to 400 times the rate seen over geological time (Webb 1987: 1), through conversion of natural habitat and direct population reduction (see Posey 1992). Agricultural expansion on private and public land continues throughout Alberta and the area designated for timber harvesting is expected to reach almost 190,000 km² (about 28% of Alberta) by the year 2000. Forests in Alberta are being harvested at an annual rate of about 400 km² (Price 1991: pers. comm.). Oil and gas and other nonrenewable resource industry activities also continue to infiltrate remnants of Alberta's natural ecosystems. Large resort developments to meet the demands of a growing international tourism industry also pose a threat. As the human population expands, the last wild habitats will continue to shrink. The islands of nature we leave intact–parks, reserves, sanctuaries–will experience species loss in proportion to their diminishing size (Wilson 1989).

Competition for areas supporting natural resources is often waged in an economic arena favouring uses that generate high monetary returns. But, as discussed above, natural ecosystems have other values that cannot be replaced. This renders them not just valuable but priceless. The World Conservation Strategy (IUCN 1980) indicates that a sustainable development process must recognize the value of nonmaterial benefits to the well-being of society and quality of human life. It is no longer appropriate to consider only the monetary value and short-term interests when allocating resource use. The full range of benefits derived from native ecosystems must be considered. Because development of Alberta's native ecosystems continues and is expected to escalate, especially with respect to forestry resources, it is urgent that all the values associated with Alberta's natural areas be considered before further development occurs.

> *Protected natural areas is only part of wise environmental management, but an essential part. National parks and other protected places are our lifeline to an ecologically stable future. ...They do not impede our future, they anchor it. They are not a repudiation of economic development. They balance it (Task Force on Park Establishment 1986: 4).*

In Alberta's short history of settlement and development, the abundance of Alberta's diverse natural resources has been taken for granted and exploited without much thought given to the cumulative effect of all these activities. In many cases, individual resources, species or blocks of land were not considered in the context of the complex ecological system of which they were a part. As a result, some natural ecosystems have been exploited to the point of becoming endangered. For example, Gauthier and Henry (1989: 187) conclude:

> *The net result has been that the Canadian prairies have become one of the most endangered natural habitats in Canada.*

Stan Rowe (1990: 228) reminds us that:

> *We have not yet learned to visualize the earth spaces in which we live as living spaces, as vital surrounding systems that sustain us. Yet when these living spaces are endangered, so are we.*

It is already acknowledged that some natural ecosystems in Alberta are poorly represented as protected areas, while others are not (Swinnerton 1991; Pachal 1992; Sangster 1990). Species extinctions have occurred (Posey 1992) and more are predicted.

> *It tends to be characteristic of human beings that we do not recognize a part of the natural world as a resource and begin to consider the need for it, until we see that we are in real danger of losing that resource (Pachal 1992).*

It is imperative to act now to prevent any further permanent losses in threatened Alberta ecosystems and to put in place protection mechanisms to safeguard those areas not yet significantly affected. To do so, we also need to learn more about our natural heritage before it is lost or drastically changed.

> *In essence, we can create for the future, or we can be forced to react to an increasingly impoverished environment (McTaggart-Cowan 1989: 193).*

In Alberta, that opportunity to create, rather than react decreases every day. Prince Philip in the foreword to *Endangered Spaces: The Future of Canada's Wilderness* states:

> *Canada has an almost unique opportunity to ensure that future generations will be able to see examples of the state their land was in before the rush for development and exploitation began. The task is to conserve a whole range of viable ecosystems and habitats covering all the country's natural regions. It is also necessary to ensure that those human activities that impinge directly on the natural environment, such as forestry, farming and commercial fishing, adopt sound conservation practices.*

We must recognize that we have an obligation to future generations of Albertans—to provide for future options for them. The late Doug Pimlott said:

> *Areas preserved from exploitation provide future generations the opportunity to make choices which should be their right to make as well as ours (Hummel 1989: 269).*

This urgency to protect natural ecosystems is also fueled by our rapidly growing awareness that there are few places left on earth where we humans have not etched an indelible mark, and that some of the original must be saved for the future, a kind of "banking of the principal."

> *How can we expect that precious thin envelope, the biosphere, to sustain life indefinitely into the future if we cannot place a tithe of at least 10% of its land surface beyond the immediate reach of either inadvertent or deliberate human alteration? (Task Force on Park Establishment 1986: 6).*

There is a growing public knowledge, interest and concern that past and present actions are threatening our very existence and eliminating future options for survival. The lessons of the far-away Brazilian rain forest and close-to-home Canadian prairies have not gone unheeded. No longer are natural resources considered unlimited or to be thoughtlessly exploited. The public wants to know where Alberta stands when it comes to responsible stewardship of her wonderful and diverse natural environments. This report has been written to help in that assessment, and to serve as a basis for action.

Chapter 2

Alberta's Natural Diversity

All ecosystems are made up of nonliving (abiotic) and living (biotic) components. They are regulated by physical factors such as temperature, moisture, light, wind, geography and geology. To function, they require energy (light) and matter in the form of water, gases and nutrients.

The most significant abiotic factors influencing ecosystem development in Alberta are moisture and temperature, latitude and elevation (Hardy 1967). Alberta's climate varies from north to south—latitude and elevation operate indirectly through their effect on climate. There are three climatic zones (Longley 1967): (1) short, cool summer (roughly north of the North Saskatchewan River and including the foothills); (2) long cool summer (Edmonton south, excluding the foothills) and (3) steppe or semidesert in southeastern Alberta.

Because of Alberta's high latitude (distance from the equator) the days vary greatly in length. The Pacific Ocean is a moderating factor on Alberta's cold winters; and several times each winter warm Pacific air will displace cold Arctic air, especially on the eastern side of the Rockies, and melt the snow. Most precipitation falls during the summer, with one-third or less falling between November and April. Alberta is a sunny province, with most areas receiving more than 2000 hours of sunshine per year. Much of the solar heat is absorbed during the summer, with its long days and lack of atmospheric moisture and dust (Spalding 1980).

A diversity of biological communities has evolved in response to the range of abiotic factors. The six major soil types in Alberta harbour billions of organisms ranging from bacteria to small rodents. In addition, there are more than 2,000 species of plants, 250 species of birds, 90 of mammals, 50 of fish, 18 of amphibians and reptiles, and 12,000 insect species. Twelve species are listed as endangered in the 1987 Wildlife Act: peregrine falcon, whooping crane, wood bison, swift fox, burrowing owl, ferruginous hawk, woodland and barren-ground caribou, piping plover, mountain plover, trumpeter swan and white pelican. Others have been identified as rare, including the western painted turtle, plains hognose snake and great plains toad. Although more than 300 Alberta plants have been identified as rare, there is insufficient information to be able to establish if they are endangered (Posey 1992).

Only in the past 20 years have land use planners and managers developed classification systems that differentiate Alberta's native ecosystems. Early classifications were single purpose, based on factors such as soils, insects or climate (Strong and Leggat 1981). The newer ecological land classification systems (ELC) consider the biological and physical components of the land, usually characterized by a combination of climate, geomorphology, soils, hydrology and vegetation. Their development requires input from several disciplines, such as hydrology, geography, geology, pedology, botany, zoology and ecology, in collecting and interpreting data. The product of an ELC is usually a map delineating land classification boundaries and an accompanying description of the classification.

There are three major ELC systems that have been applied to Alberta, representing different degrees of detail and differentiation. The National Park Natural Regions system (Figure A-1) distinguishes among natural landscapes and/or environments in Canada, whereas the Natural Regions of Alberta (Figure 2-1) and the Ecoregions of Alberta (Figure A-2) provide greater detail. Only the Natural Regions of Alberta system will be discussed in this chapter, as it forms the basis for this report. The other two systems are described in Appendix A.

The Natural Regions of Alberta

Alberta Tourism, Parks and Recreation has developed a system of differentiating the native ecosystems of Alberta, called the "Natural Regions of Alberta." (The amalgamation of Alberta Recreation and Parks

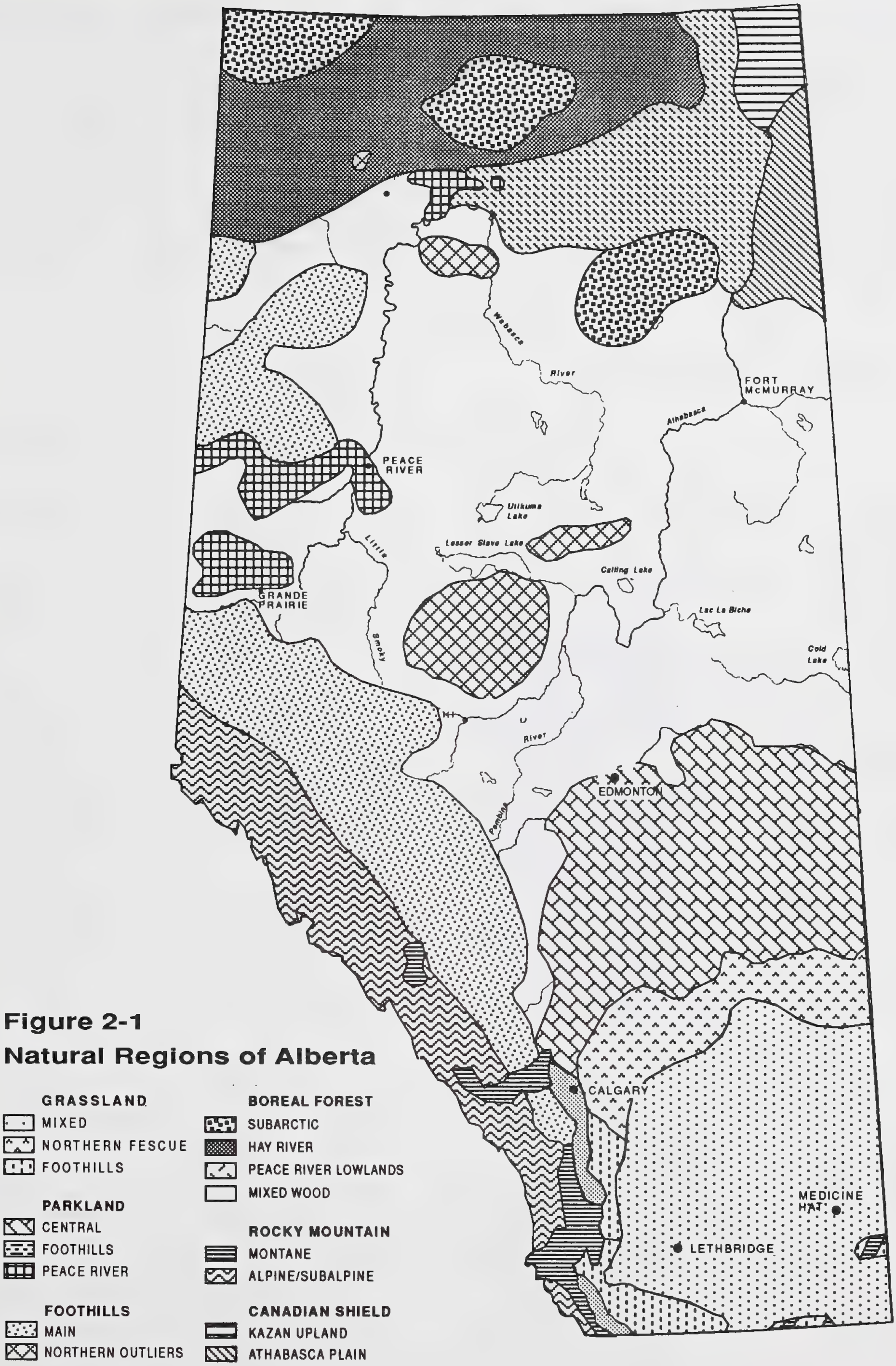


Figure 2-1
Natural Regions of Alberta

SOURCE: Adapted from Alberta Recreation and Parks (1990) and Alberta Tourism was announced on February 20, 1992.) This Natural Regions system was devised for the Ecological Reserves program, initiated to protect ecologically representative areas throughout the province (for further information see Ecological Reserves in Chapter 4). It reflects the broad diversity that is easily recognized by the layperson (Cottonwood Consultants 1983).

There are six major regions: Grassland, Parkland, Foothills, Rocky Mountain, Boreal Forest and Canadian Shield, each with two or more subregions. Each designation is based on recurring distinctive landscape patterns of vegetation, soils, landform and to a limited extent, wildlife. These factors as well as climate, significant features and development have been described in detail (Alberta Recreation and Parks 1979a; Cottonwood Consultants 1983).

Table 2-1 provides a summary of the general location and extent of each of the six natural regions and 17 subregions (also termed biogeographical zones). The following sections provide general descriptions of the predominant ecosystem impres-

Table 2-1
Distribution of Natural Regions in Alberta

Natural Region	General Location	Area (km²)	Percentage of Province
Grassland	south	90,685	13.7
Mixed		61,480	
Northern Fescue		20,220	
Foothills		8,985	
Parkland		81,290	12.3
Central	central Alberta	63,910	
Foothills	paralleling Rocky Mountains from Calgary south	2,980	
Peace R.	Grande Prairie and Fairview-Peace River areas	14,400	
Foothills		82,220	12.4
Main	broad band paralleling Rocky Mountains (Calgary N)	67,820	
Northern Outliers	Swan Hills area south of Lesser Slave Lake & area east of Lesser Slave Lake	14,400	
Rocky Mountain	southwest border	43,745	6.6
Montane	Bow Valley corridor-Banff to Calgary, also parallel to alpine/subalpine areas S of Calgary	7,365	
Subalpine/Alpine	High mountain areas along B.C.\Alberta border	36,380	
Boreal Forest	northern 1/2 province	344,605	52.1
Subarctic	northwest corner of province, N of Peace R. & NE of Fort McMurray	30,860	
Hay R.	N of Peace R. from western border to Slave R.	50,030	
Peace R. Lowlands	Peace R. valley E of High Level	30,090	
Mixedwood	Stretching from W of Red Deer to High Level, the B.C. border W of Grande Prairie to Sask.border E of St. Paul to NE of Fort McMurray	233,625	
Canadian Shield	northeast corner of Alberta	18,640	2.8
Kazan Upland	N of Fort Chip, E of Slave R.	7,300	
Athabasca Plain	N shore of & S of Lake Athabasca	11,340	
TOTAL		**661,185**	**100.0**

SOURCE: Alberta Forestry, Lands and Wildlife, Public Lands Division

sion of each natural region. Within each subregion there is a variety of site types, based on topography, altitude, aspect and drainage. These include such features as: uplands (both sandy and nonsandy), ridges, valleys, wetlands of various depths, chemistry and permanency, and areas with permanent ice and snowfields.

Grassland

This hot, dry and windy region forms the prairie of southern Alberta, east of the foothills and north to Drumheller and comprises about 14% of the province. Most of the native vegetation of this region has either been eliminated by cultivation or simplified by grazing (Posey 1992). Existing native prairie grasslands support a diversity of plants, dominated by grasses. Short grasses such as blue grama and needle-and-thread grow on the most arid sites along with cactus and sagebrush, while rough fescue, taller grasses and shrubs are found in moister areas. Trees and shrubs are found along the streams and canals (Posey 1992). Wetlands support a variety of aquatic plants and breeding and migrating aquatic birds.

There are three subregions of the Grassland Natural Region: Mixed, Northern Fescue and Foothills, separated primarily by climatic factors. The Mixed Grassland is a mixture of short and medium height species. Agriculture, the dominant land use in the region, has removed most of the native grass and shrub species. Almost all remnants of native species are found in areas considered unsuitable for cultivation.

Populations of native animal species that have been greatly eliminated or forced out of this part of Alberta include the swift fox, black ferret, plains bison, Great Plains grizzly, Great Plains wolf, moose, black bear, whooping cranes and trumpeter swans. The pronghorn antelope, which cohabited with the great herds of bison, faced extinction in the early 1900s. Its numbers have increased to between 10,000 and 20,000 in southern Alberta. Other plant and animal species of the grasslands include various cacti, yucca plant, butte primrose, sage grouse, burrowing owl, eastern short-horned lizard, prairie rattlesnake, kangaroo rat, grasshopper mouse, sage brush vole, numerous gopher-like burrowing mammals, coyote, red fox and white-tailed and mule deer.

In the Northern Fescue Grassland are found western meadowlark, Bairds sparrow, white-tailed prairie hare, Richardson's ground squirrel and coyotes. Among the animals that live in the Foothills Grassland are pocket gophers, voles, various shrews, long-tailed weasel, the occasional cougar, and white-tailed and mule deer.

The overall impressions of the Grassland Natural Region are many: very dry, often dusty, wide-open skies, pale in colour for most of the year, flat as far as you can see, monotony broken only by the coulees, rivers and creeks, vulnerability and toughness, a land of extremes. The evolution (and coevolution) of the plants and animals of this ecosystem speaks of physiological and morphological adaptations to extreme conditions of drought, heat, cold and windiness. For many people, the grasslands are deceptively simple and boring—in fact there are more than 400 species of native plants in this natural region.

Parkland

An undulating and variable landscape with a mixture of wetlands, rich fescue grasslands and deciduous forests, this diverse and productive region comprises about 12% of the province. Because of its rich soils and moderate rainfall, agriculture is well developed in this region and it is one of the most productive areas of the world. It is also the most densely populated part of the province. It consists of three subregions: Central, Foothills and Peace River, divided on the basis of geographic location and major vegetation differences. Central Parkland represents a transition area between grasslands and boreal forest and Foothills Parkland is a transition between grasslands and the Rocky Mountains. The Peace River Parkland subregion in the Grande Prairie-Peace River region is drier and warmer than the surrounding boreal forest. Except for small areas extending into the northern United States, the Parkland Natural Region is unique to the Canadian prairie provinces.

The Parkland is characterized by fescue (or bunchgrass) prairie interspersed with aspen and poplar (Posey 1992). Other plants and animals of this region include: wild rose (Alberta's provincial flower), chokecherry, silver berry, saskatoon berry, burrowing rodents, beaver, muskrat, mink, snowshoe rabbit (varying hare), lynx, weasels, foxes, coyotes, white-tailed and mule deer (abundant), garter snakes and hordes of insects. The Parkland supports the most diverse bird fauna in North America, including many species of aquatic birds, warblers and birds of prey. Moose are expanding their range into parts of the parkland (Posey 1992). There are a few black spruce and Labrador tea bogs found in this natural region. The Peace River Parkland supports a high density of black bears with many colour variations (Spalding 1980).

Foothills

This region represents a transition zone between the Rocky Mountain and Boreal Forest natural regions and represents about 12% of the province. It consists mainly of coniferous forest covering hills and ridges. The region is divided into two subregions: the Main Foothills and the Northern Outliers. The Main Foothills, which flanks the Rocky Mountains, is characterized by long, forested (usually with lodgepole pine) northwesterly trending ridges with steep-sided valleys between. The Northern Outliers consists of isolated hills in the western part of the Boreal Forest region with climate, vegetation and wildlife similar to the Main Foothills subregion.

Many commercial resources are found in the Foothills: timber, coal, natural gas and oil. Grazing occurs in parts of the region and it is heavily used for recreation.

Lodgepole pine forests grow in areas recently or frequently ravaged by fire, while spruce-fir forests are developing in the northern portion and the Swan Hills (Posey 1992). Aspen and balsam poplar are found on the warmer, south-facing slopes and in river valleys. There are scattered grasslands in the broader valleys and on the southwest-facing slopes, particularly those subjected to chinook winds.

The Foothills region is home to a wide variety of plant and animal species—many of which have not yet been significantly displaced or destroyed. These include moose, wapiti (elk), woodland and mountain caribou, white-tailed and mule deer, bighorn sheep, mountain goats, mountain lion, marten, wolverine, grizzly and black bears, coyotes, lynx, snowshoe hare, ground squirrels, peregrine falcon and grouse. Several of these animals range into the foothills during the colder months of the year and move up into the mountain valleys and meadows in the summer. The region is laced with rivers, streams and lakes supporting several species of fish, both native and introduced, as well as aquatic mammals and birds. Raspberry, bunchberry, fireweed, yarrow and other forbs are also common.

An outstanding part of the Northern Outliers is the Swan Hills upland, covering an area of about 950 km^2 south of Lesser Slave Lake. Because this area is cooler and moister than the surrounding mixedwood boreal forest, it is much less susceptible to forest fires. There are several stands of Engelmann spruce at least 300 years old, in association with lodgepole pine and subalpine fir. These trees are found on well-drained upland sites while in the poorly drained lowland areas there are deep patterned peatlands several thousand years old. Moose, black and grizzly bear, wolf, lynx and snowshoe hare are among the animals that live in the Swan Hills.

Many of the rich and varied natural resources of the Foothills Natural Region are being harvested, especially trees, coal and oil and gas. Because of its hilly forests, abundant clear, cold streams, rivers and lakes, and variety of wildlife, the region is also very popular for outdoor recreation activities such as camping, trail riding, hiking, fishing, hunting and a variety of nonconsumptive activities.

Rocky Mountain

The Rocky Mountain Natural Region consists of the front and main ranges of the Rocky Mountains of southwestern Alberta as well as the higher slopes of the Cypress Hills in southeastern Alberta. It represents about 7% of the province. The upper Bow River valley, west of Calgary, and the drier forested ridges of southwestern Alberta (e.g., Porcupine Hills and the Whaleback) are also part of this region. The most diverse range of vegetation types in Alberta is found in this natural region. These range from open dry grasslands, ridge systems and deciduous woodlands to coniferous forests and alpine tundra. Many of Alberta's large rivers originate in this area. The Rocky Mountain region has a number of rare plant and animal species and geologic features, unique vegetation types and major special features such as the Columbia Icefields, Castleguard Caves, and hot springs. The region is divided according to climatic factors into three sections: Montane, Subalpine and Alpine.

The Montane subregion supports Douglas fir (on warm, dry slopes), limber pine, lodgepole pine and white spruce (on north-facing slopes and wetter areas). Aspen is found in drier areas and balsam poplar in valley bottoms. The Subalpine, (which ranges from 1,700 to 2,000 m above sea level (ASL), supports Engelmann spruce, and subalpine fir as well as the low-growing grouseberry, mountain heathers and false huckleberry.

The Alpine subregion has an Arctic-like climate and is located above the timberline. A vast array of wild flowers grows in alpine meadows along with various types of heath (small, hardy shrubs). Waterlogged soils and fens support other small shrubs. Plant growth is sparse in exposed rocky areas.

The Rocky Mountain Natural Region supports a number of large animal species such as the grizzly bear, which frequents alpine meadows and fens in summer and roams widely, foraging on roots, small and large mammals, and berries. Mountain goats, bighorn sheep, mountain caribou, moose, mule deer, wolves, and cougars also range throughout this region. The golden eagle, hoary marmot, golden-mantled and Columbian ground squirrels, and pika are other signature species of the Rocky Mountains. In the forests live ermine, mink, marten, fisher and wolverine. A variety of birds inhabit this region, including white-tailed and willow ptarmigan, dippers and Clark's nutcracker. Trout and mountain white-fish inhabit the rivers and streams of the Eastern Slopes region (Posey 1992).

The Rocky Mountain Natural Region holds a special fascination for many Albertans and visitors. Not only does it have some of the most spectacular mountain wilderness scenery in the world, it supports a wide range of plants and animals tenaciously adapted to the extreme conditions of the region. It is defined by extremes in climate, topography, size of organisms (from large mammals to small ones, tall Engelmann spruce to tiny alpine flowers) and represents, for many, the mystery of an unknown and often inaccessible wildness.

The Rocky Mountain Natural Region has great potential for resource extraction and recreational use. The harsh climate and low productivity of this area, however, make it highly susceptible to human disturbance.

Boreal Forest

The Boreal Forest is Alberta's largest natural region, representing about 52% of the province. It consists of large areas of aspen, balsam poplar and white spruce interspersed by wetlands (ponds, bogs, fens and muskeg). The muskeg or peatlands comprise about 30 to 50% of this natural region. These are areas that have more than 30 cm of incompletely decomposed organic matter on top of mineral soils or bedrock. In many cases this accumulation has been going on for thousands of years. In these poorly drained areas, the soils remain saturated and frozen for longer than the warmer and better drained uplands, and the rate of decomposition is much slower.

There are three different kinds of peatlands (Spalding 1980): sedge fen, tamarack fen and black spruce bog, characterized by accumulations of sphagnum mosses. Fens have more water movement through them, are more nutrient-rich and less acid than bogs. In the sedge fens, there are no trees but scattered low willows and dwarf birches, with grasslike sedges (*Carex* species) a major component surrounding open water areas. Tamaracks are the principal tree in tamarack fens with some black spruce, swamp birch and willows forming a ragged shrub layer. The ground in tamarack fens can be quite uneven, with vegetation forming clumps. The spruce bogs are less wet and have a more even cover of sphagnum mosses, with Labrador tea and bog cranberry the most common shrubs.

Because peatlands are generally much wetter than the surrounding uplands, they usually do not burn, so form effective firebreaks. However, evidence of past fires in Alberta's peatlands has been found, indicating that droughts have occurred. There is concern that global warming could increase the frequency of drought occurrence in peatlands, thus threatening millions of hectares in Alberta.

The Boreal Forest Natural Region consists of four subregions: Subarctic, Hay River, Peace River Lowlands and Mixedwood. These are separated on the basis of climate, landscape-forming processes and vegetation patterns. The forests of this area range from closed-canopied coniferous forests of black spruce and jack pine to mixedwood forests of trembling aspen and balsam poplar with white spruce, balsam fir and black spruce. Fire plays a significant role in keeping most of the forests of this region at a juvenile stage.

The prevalence of wetlands and peatlands is a major characteristic of this natural region. The vegetation of the wetlands, less affected by fire, is more likely to reach a stable or climax condition. Water-filled depressions and poorly drained lowlands are vegetated by sedges, willows and/or black spruce. These provide diverse and productive habitat for numerous species of waterfowl. Rivers and streams of this region also provide valuable habitat for many species, including the most northern population of American white pelicans.

> *The boreal forest is a significant habitat for animals that require large expanses of territory to hunt—the wolverine, marten, fisher, lynx, wolf and bear...The remoteness and productivity of the boreal forest has protected these habitats ... The boreal forest is a "last refuge" of the whooping crane, bald eagle, peregrine falcon, woodland caribou, American bison, wolverine and other threatened species (McCord 1989: 6).*

The northern boreal forest is home for about one-quarter of Alberta's grizzly bears and many bald eagles. Other species include beaver, lynx, mink, white-tailed and mule deer, and wapiti. Old growth forests provide habitat for woodland caribou, many orchids and fungi (Posey 1992). This region also supports over 100 species of birds and thousands of species of insects.

The largest portion of the Boreal Forest Natural Region is the Mixedwood subregion, which is characterized by deciduous forests of trembling aspen with lesser amounts of balsam poplar. Because of the frequency of fire, white spruce and balsam fir climax forests are not well represented. Open jack pine stands occur on drier sites. Wetlands are vegetated by sedges, willows or black spruce, which is the wetland climax species.

The Hay River and Peace River Lowlands subregions differ from the Mixedwood subregion in that the mixedwood forests of trembling aspen and balsam poplar contain mature white spruce, balsam fir and black spruce stands throughout much of both subregions. Jack pine and black spruce stands are found on higher, better drained sites more often than in the Mixedwood subregion. There are localized pockets of permafrost in colder and poorly drained areas.

The Subarctic subregion supports closed-canopied coniferous forests of black spruce and jack pine as well as paper birch. Mixedwood forests of trembling aspen, balsam fir and white spruce are found on warmer, wetter sites and open stands of mature black spruce and jack pine are found in drier locations.

This region is much less accessible, and less easily travelled than other natural regions of Alberta, so is much less understood and inventoried. Further study is required to define the variety of the region and identify significant areas (Cottonwood Consultants 1983). Many people have disregarded this region because of its seemingly unlimited size, lack of understanding of its unique complexities and, until recently, lack of economically valuable natural resources. However, in the past 20 years the Boreal Forest Natural Region has seen major development of its oil sands, forests, and oil and natural gas reserves.

Canadian Shield

Though the Canadian Shield occupies a large area of Canada, only a small portion of it (3% of the province) extends into Alberta, in the northeast corner near Lake Athabasca. This region is even less known to Albertans than is the Boreal Forest. It is marked by short summers and long, harsh winters and consists of bare granite outcrops, with little soil development. There are scattered stands of stunted jack pine and black spruce, some paper birch and sparse growth of grasses, shrubs and lichens. The area is characterized by nutrient-poor lakes.

The region is divided geologically into two subregions: the Kazan Upland and Athabasca Plain. A significant feature of the Kazan Upland is a number of disjunct or rare plant species (Pachal 1992). Significant features of the Athabasca Plain include active sand dunes that are among the largest in the world, as well as diverse dune forms, paleodunes and kames. Jack pine forests dominate the landscape and bald eagles and osprey are abundant. This area supports a number of rare plants, animals and birds, including the semipalmated plover. Plant species not found elsewhere in Alberta are found here (Pachal 1992).

Summary

The diverse natural landscapes of Alberta can be divided into six broad natural regions: Grassland, Parkland, Foothills, Rocky Mountain, Boreal Forest and Canadian Shield. Each region and its subregions represent a characteristic range of communities of organisms existing interdependently within the limitations posed by the area's geography and climate. Within each subregion is a variety of landform features that contribute to variations in the communities found there. Alberta Tourism, Parks and Recreation has distinguished 134 landform themes for Alberta, the combination of a general subregion characteristic and a local landform feature (Morrison 1990: pers. comm.).

The development of Alberta has removed, changed or slated for change, more than 50% of Alberta's natural landscape. Despite this significant human alteration, and though in some areas they are small and incomplete, examples of the original, natural living systems can be found throughout the province.

Estimates of what remains of Alberta's natural ecosystems are summarized by natural region in Table 2-2. Comprehensive and detailed information is not available since no inventory has been done.

As noted, Alberta has suffered plant and animal extinctions and will continue to do so as a result of human impact on remaining areas that support examples of native ecosystems. In Alberta as elsewhere, humans have replaced these dynamic, self-sustaining complex living systems with much simpler systems requiring continual human maintenance. They have been replaced to cultivate crops; to harvest trees, coal, oil and gas and other raw natural resources; and to make places for us to live. In many areas, the natural processes that ensure that life "takes care of itself" have been changed or completely eliminated. For example, to maximize crop growth and minimize losses from weeds and insects, farmers must apply artificial fertilizers and pesticides on an ongoing basis. In so doing, the vital role of the soil in cycling nutrients and providing a proper substrate for plant growth has been modified. Intensive cultivation has also caused the serious erosion of soil.

Much of Alberta's "nature" remains a marvellous mystery—there is so much that we do not yet understand about how natural ecosystems function. We do know, however, that we derive benefits from allowing areas that support examples of natural ecosystems to continue. This situation is similar to human medicine: doctors intervene where they feel they must, but leave nature to do as much as it can to allow the person to heal and live.

Table 2-2
Estimated Area Supporting Representative Examples of Alberta's Natural Regions
(% of natural region area)

Grassland	overall:	<20 %
	Mixed:	25 % (heavily eroded by oil and gas development, includes intensively used areas (Wallis 1991: pers comm.)
	Northern Fescue:	<1 % (Wallis 1991: pers comm.)
Parkland	overall:	<5 % of region's total area composed of tracts greater than 10 km^2 (Wallis 1991: pers comm.)
	Central:	<5% (Wallis 1991: pers comm.)
	Peace River:	<1% (Wallis 1991: pers comm.)
Foothills	overall:	25% (based on 5% of region's total area protected and 17% uncommitted to use) (Pachal 1991: pers. comm.) (>90% has native vegetation)
Rocky Mountain	overall:	70% (Wallis 1991: pers comm.)
Boreal Forest	overall:	60% (30% for committed productive forest plus 10% for other uses) (Wallis 1991: pers comm.)
Canadian Shield	overall:	>95%

*very rough estimates, based on several sources and pers. comm. with Wallis and Pachal (refers to lands and waters both protected and unprotected)

Chapter 3

Land Management and Protected Areas Systems in Alberta – An Overview

Figure 3-1 shows the administrative status of lands in Alberta. The Green Area is defined as "nonsettled forest lands managed for forest and watershed protection, recreation and other multiple uses" (Alberta Forestry, Lands and Wildlife, Public Lands 1988b:2). The Green Area covers about 53% of the province and is all publicly owned or Crown lands. Permanent settlement and agriculture are restricted, although grazing, forestry, mining, oil and gas extraction, wildlife management, and various recreational activities and development may take place in the Green Area.

The White Area represents most of the settled and privately owned land, about 40% of the province, and includes most of the Grassland and Parkland natural regions. Most of this land is used for agricultural production or urban and industrial development. The Grassland and Parkland natural regions of Alberta have suffered the greatest transformation and species losses because of their great productive capability for agriculture. Those areas not suitable for agriculture were considered adequate and suitable for the wildlife and other ecosystem functions that had earlier been displaced or replaced by agriculture. What was overlooked was that productive agricultural areas had also been productive for wildlife and other indigenous species and sometimes they had been the only places where these species (and remnants of native ecosystems) existed.

Seven percent of the White Area is owned by the province of Alberta or the Government of Canada. There is ongoing reclassification of Green Area parcels to White Area, by ministerial order.

Most public land in Alberta has been "spoken for"—that is, there are one or more intended or existing uses attached to it. For example, most public lands and tax recovery lands in southern and central Alberta have grazing leases. Many of these grazing lands have been significantly altered by cattle use and other range management techniques, so that native grassland ecosystems are rare (Posey 1992).

Although the Green Area is "greener" than the White Area – has a larger representation of Alberta's natural regions – there has been significant human impact. For example, more than 70% of the Foothills and 35% of the Boreal Forest natural regions are now designated as Forest Management Agreements (FMAs)—lands to which forestry companies have access to harvest trees. Recently designated areas will be harvested over longer periods and in cutblocks, with the result that although extensive clearcutting will be eliminated, the entire FMA area will be more continuously frequented by logging operations (Wrangler 1991: pers. comm.).

The most common tracts of public land that have been left "unclaimed" in a natural state are those associated with watercourses and areas of difficult terrain, and in northern Alberta, vast areas of muskeg. Even these refuges, however, are not immune from "routine" seismic exploration (Wallis 1991: pers. comm.).

The Forest Service Division of Alberta Forestry, Lands and Wildlife is responsible for managing the forests in the Green Area. Public Lands Division manages public land within the settled areas of Alberta and Fish and Wildlife Division manages and protects fish and wildlife resources throughout the province. Other Alberta government departments such as Tourism, Parks and Recreation; Environment; Transportation and Utilities; Energy; and Culture and Multiculturalism administer legislation that can provide protection in the Green Area. These departments, along with Alberta Municipal Affairs and Alberta Agriculture, influence land use decisions in the White Area.

The remaining 7% of the province not included in the Green Area (53%) or White Area (40%) is held by the federal government for national parks, wildlife sanctuaries, military operations and Indian reservations.

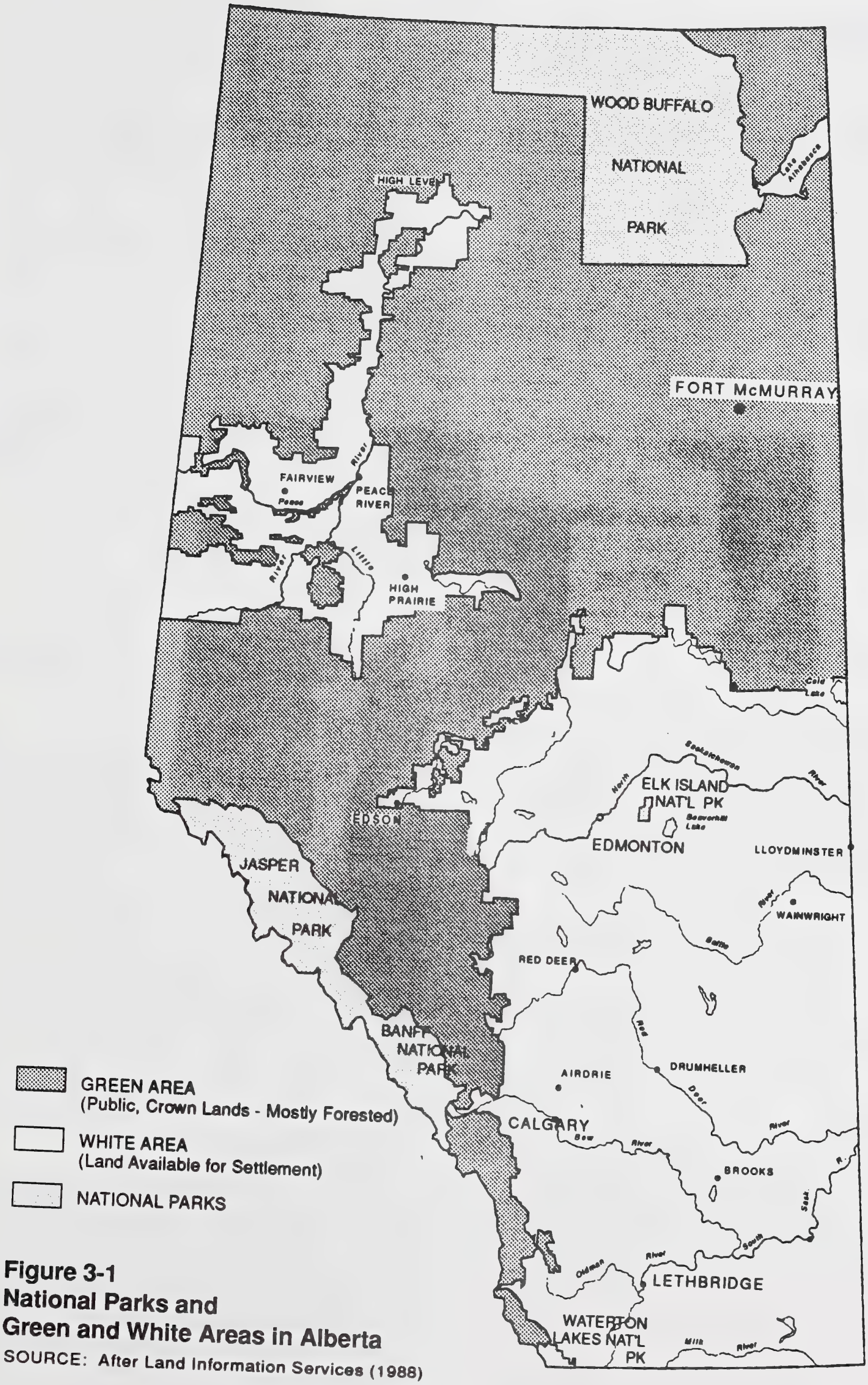


Figure 3-1
National Parks and Green and White Areas in Alberta
SOURCE: After Land Information Services (1988)

Land Management Objectives

Most of the legislation examined in Chapters 4 and 5 reflects the many uses governments, on behalf of the people of Alberta and Canada, have identified for Alberta's natural areas; uses that depend on the maintenance of the complex ecosystems they support. Some meet utilitarian and economic needs, such as "sustained use" of our renewable natural resources (forests, water, soils, wildlife) to ensure future supply and economic benefits. This may also apply to many forms of outdoor recreation. These are "conservation" objectives. Other uses meet human emotional and cultural needs such as providing inspiring outdoor experiences and preserving Alberta's unique and threatened natural and cultural heritage in perpetuity. Many of these objectives fall under "preservation."

Swinnerton (1991:3) noted that Alberta Recreation and Parks (1986:8) further distinguished between the two:

> *Preservation is not simply a less compromising form of conservation, but rather is the retention of the integrity, authenticity and intrinsic value of a resource in perpetuity.*

Swinnerton (1991:4) presents the distinguishing features of the exploitation-conservation-preservation spectrum. Exploitation represents an economic, anthropocentric (human-centred), short-term, technology-based orientation. Conservation is characterized by a social/economic, anthropocentric, long-term, ecologically and technologically based system. Preservation represents an ethical, biocentric, in perpetuity, ecology-based viewpoint.

Most of the agencies responsible for the protection mechanisms outlined in this report operate with both mandates. Swinnerton (1984: 2) defines conservation as "protection of the resource in terms of the products or benefits that may be derived from its use in the long term" and preservation as "protection of the integrity, authenticity and intrinsic value of the area in perpetuity."

At the provincial level, Alberta Forestry, Lands and Wildlife, Alberta Environment and Alberta Tourism, Parks and Recreation operate as natural resource developers and protectors. For example, under Tourism, Parks and Recreation, provincial parks are administered to preserve the natural heritage within their boundaries and at the same time provide outdoor recreation and education opportunities.

Yet the magnificent outdoor recreation and tourism opportunities present in Alberta's parks and other designated protected areas depend on their preservation or minimal disruption. Often it is because of these demands that lands are set aside. Designation may protect and maintain the natural diversity of the areas. But ironically, once designated as provincial parks or recreation areas for example, they may be used more often, accelerating their erosion and simplification. In some cases various measures are taken to confine or make the area resistant or resilient to human activity (Swinnerton 1991: 5). "Successful development" of a location may bring a totally different clientele, attracted to the services that have been put in place rather than the original character of the setting (Swinnerton 1991: 52).

One of the ways agencies have tried to balance the two objectives is by developing classification and zoning frameworks to order areas along a continuum, ranging from resource preservation to intensive development and recreational use (Webb 1987). Swinnerton (1991: 50-54) describes this as the "primitive-to-urban" continuum.

Protection Legislation, Policies and Implementation

Each mechanism examined in this report is rooted in legislation, laws passed by the federal or provincial governments. The legislation may be very specific, for example, the Willmore Wilderness Park Act which designates Alberta's only legislated wilderness park. Or it may be covered by a broad piece of legislation, such as the Public Lands Act, which covers all aspects of the management of public lands by Alberta Forestry, Lands and Wildlife. Each Act has been developed by the government, presented to the Alberta or federal legislatures, debated and passed by the Legislative Assembly or Parliament to become "law." All Acts cited in the text are listed under RSA (Revised Statutes of Alberta 1980) or Statutes of Alberta; or RSC (Revised Statutes of Canada 1985) or Statutes of Canada in the References section of this report.

The legislation usually provides a basic framework for the administering government department. In many cases the department will provide further interpretations of the law to guide its staff in developing programs and taking action. These interpretations may take the form of policies and principles to guide the development of programs, plans and annual activities. For example, Alberta Forestry, Lands and Wildlife refers to the *Policy For Resource Manage-*

ment of the Eastern Slopes (Alberta Energy and Natural Resources 1984a) and specific Integrated Resource Plans (IRP) when making land use decisions for public land in the mountains and foothills areas. Alberta Environment uses the Water Management Principles to plan water development.

In most cases, these Acts give the provincial or federal cabinet or the Minister responsible for administering the Act the power to make subordinate laws called regulations, without the approval of Parliament or the provincial legislature. Regulations pertain to the practical application of specific legislation, and have the force of law and can be enforced by the courts. Regulations are listed in the References section of this report under AR (Alberta Regulations) or CRC (Consolidated Regulations of Canada) or SOR (Statutory Orders, federal government).

The authority for the Lieutenant Governor in Council or the Minister or other designated person(s) to make regulations is outlined in the Acts. The use of regulations provides the Minister and his department officials the flexibility to make appropriate management changes without undertaking the lengthy and arduous task of changing the legislation. For example, the Forest Land Use Zone, Forest Recreation Area and Forest Recreation Trail Regulations of Section 46 of the Forests Act provide specific directions for outdoor recreational activities in Forest Land Use Zones in Alberta. Many Alberta regulations are changed on an annual basis; for example, regulations pertaining to hunting and fishing restrictions and licence fees.

Chapters 4 and 5 describe the more than 20 provincial and federal mechanisms that may be used to designate and protect representations of Alberta's natural ecosystems; how these areas are administered and managed; and what areas will be designated in the future.

Chapter 4

Alberta Government Mechanisms

This chapter describes legally designated protected areas and appropriate policies and programs administered by five Alberta government departments: Alberta Forestry, Lands and Wildlife; Alberta Tourism, Parks and Recreation, Alberta Environment, Alberta Culture and Multiculturalism, and Alberta Municipal Affairs.

Alberta Forestry, Lands and Wildlife

Alberta Forestry, Lands and Wildlife is the provincial government department responsible for managing Alberta's natural resources—fish and wildlife, public lands and forests. Five divisions administer natural resources: Public Lands, Fish and Wildlife, Alberta Forest Service, Land Information Services and Forest Industry Development. Only the first three divisions are directly responsible for ecosystem conservation and preservation.

Public Lands Division is responsible for the administration and integrated resource planning of public lands in both the White and Green areas as well as managing public lands not designated for permanent forest, or located in Special Areas or other designations such as provincial parks. Staff administer the classification, lease, development, sale or reservation of public land for recreational, agricultural, commercial, industrial or other purposes, including natural areas and use by other departments. Public Lands operates under the authority of the Department of Forestry, Lands and Wildlife Act, the Forests Act, the Public Lands Act, the Wilderness Areas, Ecological Reserves and Natural Areas Act, the Mines and Minerals Act, and the Agricultural and Recreational Land Ownership Act (see RSA 1980 and Statutes of Alberta 1985). Public Lands has its headquarters in Edmonton, with 10 regional offices and 45 district offices.

The objective of Fish and Wildlife Division is "to conserve Alberta's fish and wildlife resources and the ecosystems which perpetuate them and to provide Albertans sustainable benefits and enjoyment from those same resources" (Alberta Forestry, Lands and Wildlife 1990a). As a conservation agency Fish and Wildlife manages fish and wildlife populations to meet the needs of communities, commercial fishermen and hunters, and sports and recreation enthusiasts. It is also involved in regulating hunting and trapping and providing education and training. As a preservation agency it protects endangered and threatened species and their habitats, and manages other species to ensure their long-term survival. This division operates under the authority of the Department of Forestry, Lands and Wildlife Act, the Fisheries Act (Canada), the Fish Marketing Act and the Wildlife Act. The provincial office (in Edmonton) and five regional offices coordinate development and implementation of programs consistent with the department's Fish and Wildlife Policy. Sixty-three district offices provide direct public service.

Alberta Forest Service (AFS) Division manages (or oversees the management of) forested lands in the Green Area for a variety of purposes: recreation; watershed, range and timber management; extraction of natural resources (logging, mining, oil and gas exploration and development); reforestation and reclamation, integrated resource planning, Junior Forest Warden and Junior Forest Ranger Programs, and for protection against fire, disease and insects. Its activities are under the authority of the Department of Forestry, Lands and Wildlife Act, the Forests Act, the Forest Reserves Act, the Forest and Prairie Protection Act and the Forest Development Research Trust Fund Act. AFS staff are located in head office in Edmonton, and in 10 regional and 45 district offices throughout Alberta.

The Forest Industry Development Division, established in 1986, helps new and existing forest companies and private investors utilize Alberta's forest resources for a variety of forest products, expands Alberta's forest product export markets and attracts investment and private sector involvement in development of all renewable forest resources. The Renewable Resource Development Branch of this division works with provincial, national and international tourism and recreation industries to promote and facilitate investment and development of renewable resource projects such as four-season resort complexes, golf courses and lodge developments (Alberta Forestry, Lands and Wildlife 1990a).

Land Information Services provides basic surveying, mapping, remote sensing, aerial photography and natural resource information about the province. There are several survey, ownership and land agents Acts under which this division operates.

Natural Areas

Alberta's Natural Areas Program began in 1963, when the Department of Lands and Forests began to reserve parcels of land as examples of Alberta's biological and physical diversity for people to appreciate, enjoy and study. In 1967 the Interdepartmental Centennial Committee, as part of the Canadian centennial celebrations, extended this initiative by appointing a committee to establish a system of natural areas based on nominations from government, academia and the general public.

Between 1968 and 1973 the Natural Areas Committee classified and defined the various types of natural areas. During this time, the committee received almost 150 nominations for sites of biological significance from the Alberta representatives of the International Biological Program. In 1971, a section of the Public Lands Act (1971) was introduced to allow public land to be set aside as natural areas. In response, by Order-in-Council (order by cabinet, signed by the Lieutenant Governor in Council) 137.40 km^2 were set aside as natural areas under the Public Lands Act. Previously, approximately 42 km^2 had been designated under the Provincial Parks Act (1964) between 1968 and 1970. Between 1974 and 1981 the currently used site classification system for natural areas (see below) was finalized, and in 1981 ecological reserves were established as a separate protection mechanism.

Legislation covering the administration of natural areas and ecological reserves was passed by the Alberta legislature in December 1981 as The Wilderness Areas, Ecological Reserves and Natural Areas Act (RSA).

Natural areas are designated to protect and preserve parcels of public land in a natural state that are of special interest, have scenic value, have unique or sensitive characteristics, or contain a diversity of plant and animal habitats; and where compatible, provide opportunities for interpretation, education, research, public appreciation and/or recreation.(Lee 1991: pers. comm.).

Legislation and Government Administration

Natural Areas are administered by Public Lands Division of Alberta Forestry, Lands and Wildlife through the Wilderness Areas, Ecological Reserves and Natural Areas Act (1981). Sites are established, altered or disestablished by Order-in-Council—there is no debate in the Legislative Assembly.

Notable clauses in this Act as they relate to natural areas are:

- The power of the Lieutenant Governor in Council to make regulations respecting the administration, management, operation and utilization of natural areas (Sec. 14.1).
- Notwithstanding the regulatory powers of the Lieutenant Governor in Council, a provision is included allowing for any Minister of the Crown to gain powers and duties under this Act in relation to all or any part of a natural area (Sec. 14.2).

(These two clauses provide flexibility to manage the sites, without public input or public debate.)

- The power of the Lieutenant Governor in Council to deem any area of public land as a natural area in order to:
  (a) protect sensitive or scenic public land from disturbance and,
  (b) ensure the availability of public land in a natural state for use by the public for recreation, education or any other purpose (Sec.12).

By policy there are three categories of natural areas: educational, recreational and conservation (Rintoul 1991: pers. comm.). Each natural area may fit into one or more of these categories.

Educational Natural Areas are public lands on which features are conserved and managed for environmental education purposes. They provide relatively natural, undeveloped landscapes to serve as outdoor classrooms and laboratories in environmental education programs and serve as study areas for students of natural history. No formal interpretive or educational programming is provided by Alberta

Forestry, Lands and Wildlife.

Recreational Natural Areas are public lands that provide a relatively natural, undeveloped landscape for informal and low-intensity recreation activities such as cross-country skiing, bird-watching, picnicking, hunting, fishing and nature photography. Management objectives for recreational natural areas are to preserve the natural character of the site while providing opportunities for the public to experience the natural environment.

Conservation Natural Areas are public lands that are scenic, contain diverse or interesting biological or geological features, and/or contain important plant and animal habitats. Where such activities are compatible, conservation natural areas provide opportunities for interpretation, education, research, recreation and public appreciation of Alberta's natural heritage.

Distribution and Natural Region Representation

As of January 1991, there are 118 natural areas in Alberta covering 355.85 km² and ranging in size from a few hectares to 56.62 km² (Alberta Forestry, Lands and Wildlife 1991c). The average size of designated natural areas is 3 km². There are only five sites greater than 10 km² (and less than 56 km²). Many of these sites were identified in 1971 under the International Biological Program. Since the program began, more than 520 sites have been evaluated. An additional 151 sites totalling 699.17 km² have been nominated and reserved (with a Protective Notation or PNT - see Public Lands Reservation Procedures and Programs) for Natural Areas Program purposes (Alberta Forestry, Lands and Wildlife 1991c).

Most of the designated sites were already public land. A few were donated to the province by individuals and a few were purchased for the department through the land acquisition program of Alberta Public Works, Supplies and Services.

The conditions of the sites also vary considerably from pristine to heavily dissected by oil and gas exploration activity (Rintoul 1991: pers. comm.).

Table 4-1 outlines the number and areas of the three different categories of natural areas and Table 4-2 illustrates the distribution of these areas by natural region.

Table 4-1
Natural Areas in Alberta

Type	Number		Total Area (km²)
Conservation	54		175.42
Educational	19		50.84
Recreational	45		129.59
Total Number	118	**Total Area**	355.85

The majority of these areas are located in the Mixedwood Boreal Forest subregion. No natural areas have been designated north of Lesser Slave Lake, in the other three Boreal Forest subregions (Peace River Lowlands, Hay River and Subarctic) or the Canadian Shield areas. To date only land areas have been designated. River corridors and lakes have not been included, although in many cases natural areas provide public access to natural aquatic ecosystems.

Protection and Management

There is a wide variety of sites designated as natural areas and as outlined in the Act, no disposition may be made without the consent of the Minister. The designated uses for each site depend on its physical and biological characteristics, size, location and present uses. Conservation natural areas are the most protected by policy—they are managed so that their features are maintained over the long term, relatively free of human disturbance. Many have sensitive natural features (rare and endangered species), which preclude extensive use. For educational natural areas the carrying capacity of the site determines the optimum level of use to ensure that natural features and processes are conserved. Recreational natural areas have existing or potential recreational use and in many cases act as public access to lakes and rivers.

No site-specific regulations have been put in place, although the department is considering regulation of off-highway vehicle use in Beehive Natural Area (Lee 1991: pers. comm.). Management plans have been approved for five of the 118 sites designated under the Natural Areas Program and another 30 plans have been initiated or are being considered.

A distinctive feature of Alberta's Natural Areas Program is the Volunteer Steward Program, which enables members of the public, usually local groups and individuals, to actively monitor these areas and to assume a role in their management. Since 1987 several groups have incorporated as societies to participate in this program and, in some cases, to manage the area under a lease agreement with the department.

To date, 77 of the 118 designated natural areas have stewards and another 59 reserved sites have stewards. Under this program stewards agree to visit the site at least twice a year and submit an inspection report for each visit. The steward (for some sites

Table 4-2
Distribution of Natural Areas in Alberta, by Natural Region

Natural Region	Conservation (No. sites: Total area) (km^2)	Educational (No. sites: Total area) (km^2)	Recreational (No. sites: Total area) (km^2)	TOTAL (NO. SITES: & AREA) (km^2)
Grassland				
Mixed	2 : 58.14	0 : 0	0 : 0	2 : 58.14
Northern Fescue	0 : 0	0 : 0	1 : 0.10	1 : 0.10
Foothills	0 : 0	0 : 0	0 : 0	0 : 0
Parkland				
Central	11 : 11.16	7 : 7.30	7 : 3.52	25 : 21.98
Foothills	1 : 0.72	0 : 0	0 : 0	1 : 0.72
Peace R.	2 : 11.05	1 : 0.62	0 : 0	3 : 11.67
Foothills				
Main	3 : 13.25	0 : 0	3 : 4.60	6 : 17.85
Northern Outliers	0 : 0	0 : 0	0 : 0	0 : 0
Boreal Forest				
Subarctic	0 : 0	0 : 0	0 : 0	0 : 0
Hay R.	0 : 0	0 : 0	0 : 0	0 : 0
Peace R. Lowlands	0 : 0	0 : 0	0 : 0	0 : 0
Mixedwood	31 : 68.86	10 : 37.15	32 : 64.75	73 : 170.76
Rocky Mountain				
Montane	2 : 3.65	1 : 5.77	0 : 0	3 : 9.42
Subalpine	0 : 0	0 : 0	0 : 0	0 : 0
Alpine	3 : 8.59	0 : 0	1 : 56.62	4 : 65.21
Canadian Shield				
Kazan Upland	0 : 0	0 : 0	0 : 0	0 : 0
Athabasca Plain	0 : 0	0 : 0	0 : 0	0 : 0
TOTAL NO. SITES : TOTAL AREA	**55 : 175.42**	**19 : 50.84**	**44 : 129.59**	**118 : 355.85**

A complete listing of the natural areas by natural region is found in Appendix B.

there are more than one) may also become involved in special projects on the site, such as maintaining trails, conducting ecological inventories, erecting nesting structures and posting signs. Some stewards have also helped develop management plans. Others have acquired a recreational lease or licence-of-occupation for the specific use of a natural area (Lee 1990, 1991: pers. comm.).

Another mechanism that has been used to provide greater protection to natural areas is a "conservation easement," signed by landowners who agree not to develop their land adjacent to specified natural areas.

Future Considerations

There are 151 parcels of land throughout Alberta that have a Natural Area Reservation (protective notation). That is, they have been recommended by the department but have yet to be officially designated under Order-in-Council. A summary of these appears in Table 4-3, and a breakdown by natural region is found in Table 4-4. On March 11, 1992, the Government of Alberta committed to establishing 21 new natural areas within the next year, including six within the next two months (Government of Alberta 1992a).

Pachal (1992) suggests that larger areas, such as the 56.6-ha Beehive Natural Area, be designated as natural areas so they would be legally defined and better protected, than they would be as Wildland Recreation Areas.

Table 4-3
Areas Reserved as Natural Areas in Alberta

Type	**Number**	**Total Area (km^2)**
Conservation	52	269.30
Educational	26	72.25
Recreational	73	357.62
Total Number	**151**	**Total Area 699.17**

Nominations continue to be made by the public and Alberta government departments. Whenever a site is nominated by the public and/or the government, it is evaluated and referred for review to other government departments. If the site has a high priority for the program and has local public support, including the local municipality and local Member of the Legislative Assembly (MLA), the Natural Areas Program manager will recommend to the Minister that the site be established. The Minister will, in due course, bring this recommendation to cabinet and if approved, the site will be established through an Order-in-Council. The public is given 60 days notice before it becomes law.

Table 4-4
Areas Reserved under the Alberta Natural Areas Program but not Designated as Natural Areas, by Natural Region

Natural Region	**Conservation (No. sites: Total area) (km^2)**	**Educational (No. sites: Total area) (km^2)**	**Recreational (No. sites: Total area) (km^2)**	**TOTAL (NO. SITES: & AREA) (km^2)**	**ADDED RESERVED AREA ON EXISTING SITES**
Grassland					
Mixed	5 : 29.62	2 : 2.60	3 : 9.39	10 : 41.61	
Northern Fescue	4 : 12.06	0 : 0	0 : 0	4 : 12.06	
Foothills	0 : 0	0 : 0	0 : 0	0 : 0	
Parkland					
Central	13 : 21.23	0 : 0	11 : 13.49	24 : 34.72	9 : 8.41
Foothills	0 : 0	0 : 0	0 : 0	0 : 0	
Peace R.	2 : 14.91	2 : 10.40	6 : 35.41	10 : 60.72	1 : 0.65
Foothills					
Main	6 : 40.01	5 : 11.31	5 : 7.12	16 : 58.44	1 : 1.95
Northern Outliers	0 : 0	2 : 5.50	0 : 0	2 : 5.50	
Boreal Forest					
Subarctic	0 : 0	0 : 0	0 : 0	0 : 0	
Hay R.	1 : 2.53	0 : 0	0 : 0	1 : 2.53	
Peace R. Lowlands	0 : 0	0 : 0	0 : 0	0 : 0	
Mixedwood	18 : 130.84	11 : 31.18	41 : 273.78	70 : 435.80	14 : 34.20
Rocky Mountain					
Montane	1 : 7.50	1 : 0.90	4 : 2.33	6 : 10.73	
Subalpine	1 : 5.20	0 : 0	2 : 10.25	3 : 15.45	
Alpine	1 : 5.40	3 : 10.36	1 : 5.85	5 : 21.61	1 : 54.13
Canadian Shield					
Kazan Upland	0 : 0	0 : 0	0 : 0	0 : 0	
Athabasca Plain	0 : 0	0 : 0	0 : 0	0 : 0	
TOTAL (NO. SITES : TOTAL AREA)	**52 : 269.30**	**26 : 72.25**	**73 : 357.62**	**151 : 699.17**	**22 : 99.34**
			TOTAL AREA RESERVED		**798.51**

Public Lands Reservation Procedures and Programs

Protection Notations, Holding Reservations and Consultative Notations

Public Lands Division, under Section 17(d) of the Public Lands Act keeps a computerized registration system to record and manage the various interests in public lands to ensure that particular land uses and conservation objectives are achieved. This system is called the Land Status Automated System (LSAS). Potential users of public lands are required to abide by the particular reservation or notation that is placed against the land (Alberta Forestry, Lands and Wildlife 1987c, 1988d, 1988e).

A natural area reservation or ecological reserve reservation indicates that the land has been designated by Order-in-Council and cannot be removed without a rescinding Order-in-Council.

A Protective Notation (PNT) imposes restriction on land use usually due to specific natural features, such as landform, soil type or ecology. It may restrict certain uses indefinitely or it may change over time. A PNT restricts lands from sale and may also restrict agricultural or other surface land uses. More than one agency may register a PNT, but the most restrictive notation will determine the permitted land use.

A Holding Reservation (HRS) indicates that an agency has determined a specific future use based on an approved development plan or policy decision and resolution of any other land use interests. No other type of reservation or notation may be placed on the land. This reservation normally precedes an Order-in-Council, Ministerial Order, Transfer of Administration and Control or Disposition Reservation.

A Consultative Notation (CNT) does not impose any land use restriction but indicates that an agency has declared an interest in the land and wishes to be consulted before any commitment or disposition is issued on the land.

The public land registration system indicates why these notations or reservations have been placed and what restrictions are placed on the land. Reasons include:

- Surface Resource Management and Conservation – erosion, adverse soil conditions, general topographic constraints, water resource management and protection, agricultural land management and protection;
- Timber Resource Management – timber permit areas, public wood cutting, timber regeneration, liquidation, scarification, seed production, silviculture plot, research and reforestation projects;
- Recreational Resource Management – includes lake and river recreational site, commercial recreation and tourism development, provincial park and recreation area, ecological reserves, natural areas, forest recreation areas, day-use areas, trails;
- Fish and Wildlife Resource Management Areas – protection for ungulate, waterfowl, upland bird, furbearer, nongame, fisheries and rare and endangered species habitat; and special wildlife areas such as Buck for Wildlife projects, wildlife and bird sanctuaries, habitat management areas and isolated islands of habitat;
- Site of Adjacent Land Use Protection – buffers, historical site protection, industrial/commercial sites, surface extraction, structural development, water resource development, waste disposal/reclamation sites, other developed areas;
- Restricted Development Areas (see Alberta Environment section);
- Study Areas.

The information in the registration system is public and can be obtained for any parcel of land for a fee. Notations provide protection for parcels of land that may never receive specific formal legislated protection. They are also an indication of which sites the government may formally designate for protection in the future. Reservations represent a more formal and secure status for these lands.

Protection can also be provided through ecological corridor agreements. When placed on saleable public land or grazing areas, they require that a buffer or corridor on the land or adjacent to it not be disturbed. A streamcourse protection caveat to maintain the stream, bank and a certain buffer area may also be attached to a parcel of public land.

The Conservation Land Assembly Program was initiated in 1989 to return to public ownership parcels of land that had significant surface resource concerns, such as high erosion potential, fragile soils or vital watershed management value (groundwater protection, sedimentation control, sensitive riparian lands); and for which a change in land ownership would ensure greater stewardship and protection. To date, two small sites have been purchased: an area of fragile slopes along the Oldman River, which was being destroyed by all-terrain vehicles and another area adjacent to Beaverhill Lake. No surface dispositions are allowed on these sites and measures are being taken to restrict access to them (Bradshaw 1991: pers comm.).

Eastern Slopes Policy and Integrated Resource Plans

The Eastern Slopes (Figure 4-1) refers to a 90,000-km² area of mostly public land encompassing the Continental Divide (or main range), the front range and foothills of the Rocky Mountains, and stretching from the Grande Prairie region of west-central Alberta south to Waterton Lakes National Park. The uniqueness of this area lies in its bountiful natural resources, including wildlife, fisheries, forests, water and nonrenewable resources such as coal, oil and gas; its largely unaltered varied and beautiful natural landscapes; and its predominantly public ownership. The Eastern Slopes contain the headwaters of western Canada's major prairie rivers. It is the concern for proper watershed management that has guided resource management plans for this area (Alberta Energy and Natural Resources 1977, 1984a; Alberta Forestry, Lands and Wildlife n.d., 1987e, 1988b).

In 1973, the Environment Conservation Authority conducted public hearings concerning how the Eastern Slopes should be managed, that resulted in the 1977 document *A Policy for Resource Management of the Eastern Slopes* (Alberta Energy and Natural Resources 1977). This policy was intended "to ensure that all public lands and resources in the Eastern Slopes are protected, managed or developed according to a philosophy of integrated resource management" (Alberta Energy and Natural Resources 1977:3). Integrated resource management is a holistic approach to resource management, with the objective to "optimize use of the provincial resource base to achieve maximum benefits for Albertans, now and in the future" (Alberta Energy and Natural Resources 1983: 3).

Following interdepartmental reviews, a revised policy was released in 1984, with more emphasis on development and less on strict conservation (Alberta Wilderness Association 1984; Smart n.d.; Spearman 1985). For example, the new policy allowed for motorized vehicles in the Prime Protection Zones and all types of activities in Critical Wildlife Zones (see next section for clarification of these zones).

The Eastern Slopes Policy (Alberta Energy and Natural Resources 1984a) has three purposes:

1. Protection – to provide the highest level of protection for those areas known to form the unique character of the Eastern Slopes.
2. Resource Management – to foster wise mixed use of the natural resources to achieve specific goals and objectives.
3. Development – to recognize existing uses and provide for future site-specific development.

The 1984 Eastern Slopes Policy identifies 10 goals for the management of the natural resources of the Eastern Slopes part of the province:

1. Water Management – to ensure a continuous, reliable supply of clean water to meet the needs of Albertans and interprovincial users now and in the future.
2. Wildlife – to provide a variety of outdoor recreational and commercial opportunities based on wildlife resources for the benefit and enjoyment of Albertans.
3. Fisheries – to provide a variety of outdoor recreational opportunities based on fisheries resources for the benefit and enjoyment of Albertans.
4. Recreation – to provide both private and public recreation opportunities that will meet the needs of Albertans and also enhance the vacation experiences of visitors to the province.
5. Timber – to provide the optimal continuous contribution to the economy by the forest-based industries consistent with sound environmental practices recognizing other uses of the forest.
6. Rangeland – to provide a properly managed forage base of the rangelands for use by wildlife and domestic livestock.
7. Agriculture – to encourage the optimal development of the renewable resources for the production, processing and marketing of agricultural producers for an expanding domestic and export market.
8. Tourism – to encourage the provision of a diverse range of private and public sector tourism facilities, attractions, accommodations and services capable of meeting increasing demands for leisure and business-related opportunities.
9. Mineral Resources – to encourage exploration and development of all mineral resources to meet the needs of Albertans now and in the future.

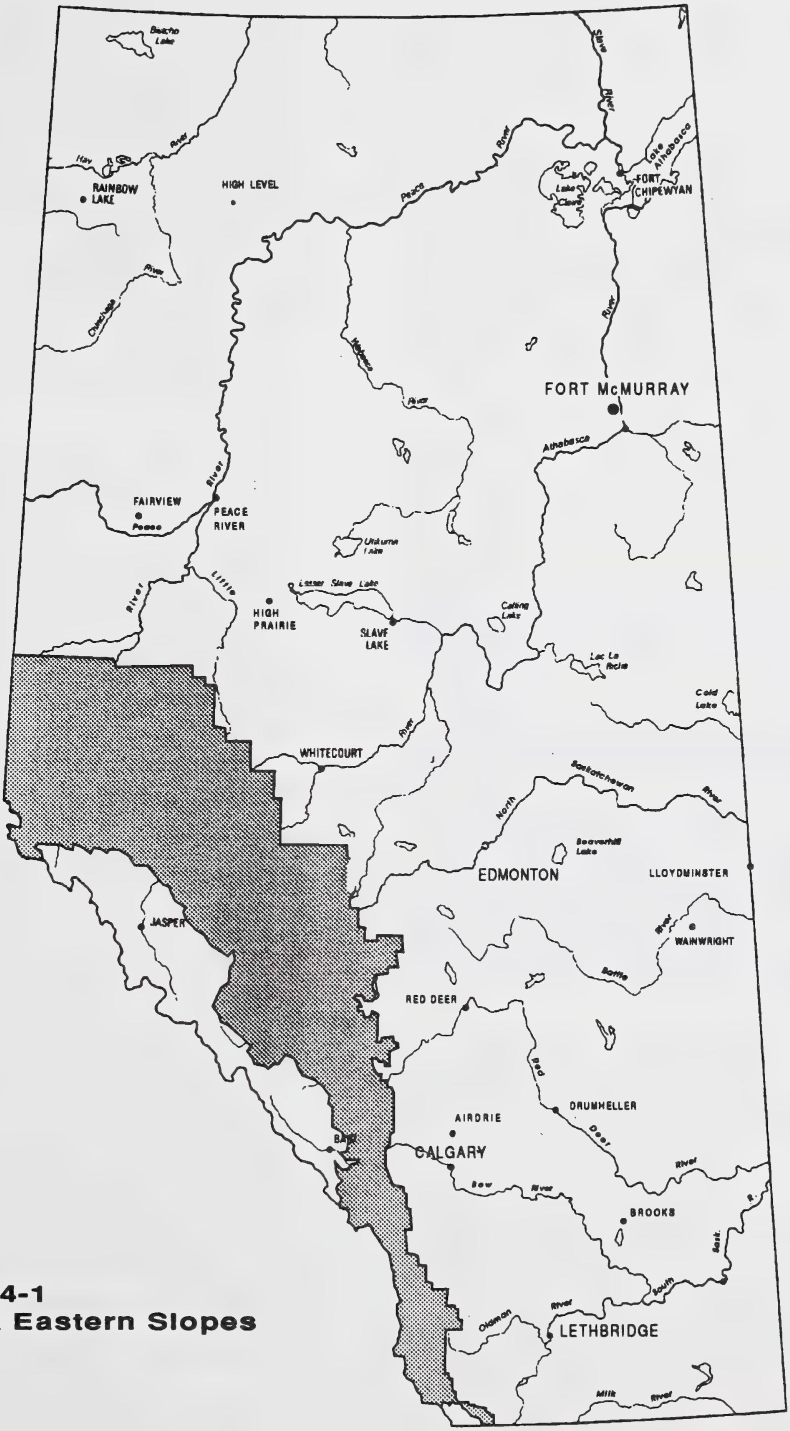


Figure 4-1
Alberta Eastern Slopes

10. Cultural and Ecological Resources – to ensure that significant features of archaeological, ecological or historical value are identified, protected and managed for scientific, educational and recreational benefits.

In addition to these general policy purposes and goals, the policy outlines a zoning system, described later in this section, that designates areas for each of the major purposes.

Direction for the allocation, use and management of public lands and resources of the Eastern Slopes and other public lands throughout the province is provided by regional and subregional Integrated Resource Plans (IRPs). Each plan defines various resource management objectives for the planning area and identifies where protection, management and development emphasis will occur. The development of each IRP is coordinated by the Resource Planning Branch of Alberta, Forestry, Lands and Wildlife and carried out by a team of provincial government staff responsible for managing the resources of the area or who are affected by activities in the area. There are many opportunities for municipal and federal government agencies, public interest groups and individuals to participate in the development of these plans.

Legislation and Government Administration

The Eastern Slopes Policy is an example of the Minister of Forestry, Lands and Wildlife exercising the authority given to him under the Public Lands Act to carry out planning for Crown land. Section 8 gives the Minister the authority to regulate uses on public land and Section 10 gives him the authority to classify lands and therefore allocate them appropriately.

The Eastern Slopes Policy provides comprehensive guidelines for managing the Eastern Slopes area; to issue permits for activities on Crown lands and for private developments. It does not have the force and effect of legislation and can be changed without debate in the Alberta legislature.

The Eastern Slopes Policy does not override existing legislation. Any activity in the Eastern Slopes must be conducted in accordance with relevant legislation. For instance, although Willmore Wilderness Park is part of the Eastern Slopes, it is administered according to the Willmore Wilderness Park Act. Other pieces of relevant legislation are the Provincial Parks Act, the Wildlife Act, the Forests Act, the Wilderness Areas, Ecological Reserves and Natural Areas Act (1981), the Public Lands Act, as well as the Planning Act of Alberta (relating to private land in the Eastern Slopes region).

Several government agencies are involved in the management of the Eastern Slopes. The departments of Forestry, Lands and Wildlife; Energy; Tourism, Parks and Recreation; Environment; and Culture and Multiculturalism all participate in the administration of the Eastern Slopes. Of these departments, Forestry, Lands and Wildlife has overall administrative powers for public lands.

There is no specific legislation that authorizes the development and approval of IRPs. The same sections of the Public Lands Act under which the Minister has authorized the development of the Eastern Slopes Policy apply (Sections 8 and 10).

Distribution and Natural Region Representation

The Eastern Slopes area (Figure 4-1) includes significant portions of the Main Foothills and Alpine/Subalpine Rocky Mountain subregions, about half of the Montane subregion and a small proportion of the Foothills Parkland in southern Alberta. About 20%, almost 19,000 km^2 is zoned as Prime Protection (Zone 1) or Critical Wildlife (Zone 2) in the proportion 2:1. Most of the estimated 12,800 km^2 that is zoned Prime Protection is in the Alpine subregion, whereas about half of the almost 6,000 km^2 zoned as critical wildlife is in the Main Foothills subregion (Wallis 1991: pers. comm.; Landals 1991: pers. comm.)

Protection and Management

The Eastern Slopes Policy has identified eight different regional zone types to meet the broad objectives of protection, resource management and development. These are listed in Table 4-5. Zoning identifies land units for which intents and objectives are specified. Certain activities are permitted, depending on the degree of protection allocated. Zoning recognizes opportunities and allocates resources at broad regional scale but does not detail specific land uses, which occurs at the subregional and local level.

Table 4-5
Eastern Slopes Regional Zones

Broad Areas	**Regional Zones**
Protection	1. Prime Protection
	2. Critical Wildlife
Resource Management	3. Special Use
	4. General Recreation
	5. Multiple Use
	6. Agriculture
Development	7. Industrial
	8. Facility

There are two zone types in which protection from disruption and damage is a priority: Zone 1, Prime Protection Zone and Zone 2, Critical Wildlife Zone. Zone 1 or 2 designation restricts certain activities but does not eliminate human encroachment on an area. The revised policy implicitly supports uses that fall outside the approved uses and in practice a series of exceptions have been made, including ice mining of the Cline Glacier and ski training camps on the Haig Glacier (Van Tighem 1991: pers. comm.).

1. Prime Protection Zone - to preserve environmentally sensitive terrain and valuable ecological and aesthetic resources. This would include high elevation forests, steep rocky slopes, high precipitation areas, scenic mountain areas and critical wildlife ranges, especially for bighorn sheep and mountain goats. Allowed uses include watershed, fisheries and wildlife species and habitat management, hunting, nonmotorized trail use, primitive camping, trapping, commercial ski development, some roads and utility corridors. This designation overrides areas zoned Critical Wildlife.

2. Critical Wildlife Zone - to protect ranges or terrestrial and aquatic habitats that are crucial to the maintenance of specific fish and wildlife populations. This would include key winter range, migration routes, calving areas, spawning areas essential for the survival of specific species such as mountain goats, bighorn sheep, elk, caribou and trout. A similar range of permitted uses as for Zone 1 areas would be considered with the addition of resource extraction activities (logging, mining, grazing, oil and gas).

Protection of natural ecosystems can be provided in all other zones, but it is not a priority.

3. Special Use Zone - lands set aside to recognize historic resources, for scientific research or to meet unique management requirements or legislative status, which cannot be accommodated in any of the other zones. Site-specific guidelines would be developed.

Special Use Zones have the potential for the most protection as uses are highly restricted, but they are rarely used to identify ecologically sensitive areas.

4. General Recreation Zone - to retain a variety of natural environments in which a wide range of outdoor recreation opportunities may be provided. Most of the areas of the general recreation zones are associated with river valley corridors or lakes. This would involve a full range of recreational activities and facility development, with some compatible resource extraction uses.

5. Multiple Use Zone - to provide for the management and development of the full range of available resources, while meeting the objectives for watershed management and environmental protection in the long term. This would include logging, grazing, oil and gas, mineral and coal exploration and development, all types of camping and off-highway vehicle use. This zoning affects about 65% of the entire Eastern Slopes region.

6. Agriculture Zone - to recognize those public and private lands in the Eastern Slopes, mostly along the eastern boundary, that are currently utilized or are considered suitable for cultivation and/or improved grazing.

7. Industrial Zone - to recognize existing or approved industrial operations, such as coal mines, gas processing plants, cement plants and large permanent forest product mills. These would be single use areas and usually associated with roads, utility corridors (pipelines, power lines etc.) and settlements.

8. Facility Zone - to recognize existing or potential settlement and commercial development areas. The zone must be able to accommodate future growth and additional areas will be zoned as required.

The policy has a clause that reads: “Since economic opportunities are not all known in advance, site-specific developments may be considered in any zone.”

A listing of the permitted and compatible activities for each of the eight zone types is found in Table 4-6. The Prime Protection areas consider five uses to be compatible, four to be possibly permitted and 11 not allowed. Among allowed uses are trapping, utility corridors, snowmobile trails, commercial ski

Table 4-6 COMPATIBLE ACTIVITIES BY LAND USE ZONE IN THE EASTERN SLOPES

ZONE ACTIVITY	1 PRIME PROTECTION	2 CRITICAL WILDLIFE	3 SPECIAL USE	4 GENERAL RECREATION	5 MULTIPLE USE	6 AGRICULTURE	7 INDUSTRIAL	8 FACILITY
Non-motorized recreation	■	■	▨	■	■	■	▨	■
Fishing	■	■	▨	■	■	■	▨	■
Hunting	■	■	▨	▨	■	■	▨	☐
Scientific study	■	▨	▨	▨	■	■	■	■
Trapping	■	▨	▨	▨	■	■	☐	☐
Trails, non-motorized	▨	▨	▨	■	■	■	▨	■
Transportation & utility corridors	▨	▨	▨	▨	■	■	■	■
Primitive camping	▨	▨	▨	■	■	■	☐	☐
Intensive recreation	▨	▨	▨	■	■	▨	▨	■
Off-highway vehicle activity	☐	☐	▨	▨	■	■	■	■
Logging	☐	▨	▨	▨	■	■	■	▨
Domestic grazing	☐	▨	▨	▨	■	■	☐	▨
Petroleum and natural gas exploration & development	☐	▨	▨	▨	■	■	■	▨
Coal exploration & development	☐	▨	▨	▨	■	■	■	☐
Mineral exploration & development	☐	▨	▨	▨	■	■	■	☐
Serviced camping	☐	▨	▨	■	■	▨	▨	■
Commercial development	☐	☐	▨	▨	▨	▨	▨	■
Industrial development	☐	☐	▨	☐	■	▨	■	▨
Residential subdivisions	☐	☐	▨	▨	▨	■	▨	■
Cultivation	☐	☐	▨	☐	▨	■	▨	▨

■ Compatible Use – Uses that are considered to be compatible with the intent of a land use zone under normal guidelines and land use regulations.

▨ Permitted Use – Uses that may be compatible with the intent of a land use zone under certain circumstances and under special conditions and controls where necessary.

☐ Not Permitted Use – Uses that are not compatible with the intent or capabilities of a land use zone.

These activities are only representative of the range of activities that occur in the Eastern Slopes. For these and any other activities, the possibility of whether they should or should not take place in a particular area must always be measured against the fundamental management intentions for that zone. Since economic opportunities are not all known in advance, site-specific developments may be considered in any zone.

As integrated resource plans are completed and approved, this table and the regional zoning maps will development, and oil and gas activity. Mineral surface leases may be approved where adequate environmental protection is assured.

Only three activities are considered compatible in the Critical Wildlife zone: nonmotorized recreation, hunting and fishing, 12 uses are "permitted" and five (intensive recreation, cultivation, commercial, industrial and residential development) are not allowed.

The protective zoning provided by the Eastern Slopes policy does not guarantee that protection is indeed provided or consistently applied across the Eastern Slopes. These areas do not have protective notation but are only "red-flagged." Development proposals that affect these zones have been approved from time to time and the degree to which an area is protected depends on the resource values for the local area (e.g., coal mining in one area, forestry in another). Compromises are made among all resource uses in each area.

The IRPs completed for the Eastern Slopes have adopted the same system of zoning, although Pachal (1992) notes that the Prime Protection Zone 1 areas are confined to lands above the treeline. These plans translate the responsibility for public lands accorded through the Public Lands Act, into a policy framework on which to make more detailed management decisions. Pachal (1992) points out that IRPs do not recognize wilderness as a resource.

In addition to a regional plan for the entire Eastern Slopes, 11 of the 21 planning subregions of the Eastern Slopes now have completed plans—representing the southern two-thirds of the area (see Alberta Forestry, Lands and Wildlife 1988c). This includes three local plans. Five are in progress (including three local plans) and six are planned for the future—a summary of the status of these plans appears in Table 4-7 and Figure 4-2.

In each subregional plan the zones are delineated on 1:100,000 scale and resource management objectives outlined on a Resource Management Area basis. For example, the plan may stipulate regular review of trail use to determine the effect on wildlife and fisheries habitat. It may also permit such uses as snowmobiling on selected routes in Zone 1 and 2 areas. It may set out specific wildlife management goals such as the density of ungulate or fish populations. The plan may also identify unique or representative ecological features or systems and recommend protective reservations be placed until further designation of the area can be made.

Eighteen integrated resource plans have been completed for areas outside the Eastern Slopes, including seven subregional and 11 local plans (Honda-McNeil 1992: pers. comm.). Most of the area covered by these is found in the Mixedwood subregion of the Boreal Forest Natural Region, with small areas in the Central Parkland, Main Foothills, Northern Outliers Foothills and Peace River Lowlands subregions. To date, the total area identified for protection equivalent to Zones 1 and 2 amounts to about 2,700 km^2 (Alberta Forestry, Lands and Wildlife 1988a). Detailed information on the location of these zones is not readily available.

Future Considerations

In addition to the six plans being prepared for the Eastern Slopes, integrated resource regional plans are being prepared for the Peace River, Northeast, Central and Southern Regions (see Figure 4-2). Plans are under way for a large area around Fort McMurray (Mixedwood Boreal Forest); another in the St. Paul area (Parkland-Boreal Forest transition area) and in the Eastern Irrigation District (Mixed Grassland); in addition to local plans in the Grande Prairie and Whitecourt areas (Mixedwood Boreal Forest); and valley and corridor areas in or adjacent to the Eastern Slopes (Honda-MacNeil 1991: pers. comm.).

Sanctuaries for Wildlife

In April 1987 a new Wildlife Act for Alberta came into force. It differed from the preceding act in that it addressed more specifically Alberta's wild animals (distinguished from domestic species) and their protection, conservation, management and use (see Alberta Energy and Natural Resources 1982c, 1984b; Alberta Forestry, Lands and Wildlife n.d.). The protection of wildlife habitat is addressed under sections 96 and 97 of the Wildlife Act, which outlines the authority of the Lieutenant Governor in Council and the Minister of Forestry, Lands and Wildlife to establish various types of protected habitat areas and regulate activities in these areas.

In its 1987-88 annual review, the Fish and Wildlife Division of Alberta Forestry, Lands and Wildlife outlined the principles and objectives under which it operates (Alberta Forestry, Lands and Wildlife 1989a). These included the following guiding principles:

"...management based on fundamental ecological principles (to maintain a high level of diversity)."

Figure 4-2 Long Range Integrated Resource Planning Program

EASTERN SLOPES REGION A

EASTERN SLOPES POLICY (C)

SUBREGIONAL PLANS
- A1 FOX CREEK-KNIGHT (P)
- A2 WHITECOURT-BLUE RIDGE (F)
- A3 SWAN HILLS-FT. ASSINIBOINE (F)
- A4 BERLAND (P)
- A5 WILLMORE WILDERNESS PARK (F)
- A6 YELLOWHEAD NORTH (F)
- A7 COLD CREEK (F)
- A8 COAL BRANCH (C)
- A9 BRAZEAU-PEMBINA (C)
- A10 ROCKY-NORTH SASKATCHEWAN (C,A)
- A11 NORDEGG-RED DEER RIVER (C)
- A12 GHOST RIVER (C)
- A13 KANANASKIS COUNTRY (C)

LOCAL PLANS
- A101 ATHABASCA RIVER SANDHILLS (P)
- A102 DAVID THOMPSON CORRIDOR (P)
- A103 BOW CORRIDOR (P)

PEACE RIVER REGION B

PEACE RIVER REGION REGIONAL PLAN (P)

SUBREGIONAL PLANS
- B1 HAY-ZAMA (F)
- B2 WATT MOUNTAIN (F)
- B3 CARIBOU MOUNTAINS (F)
- B4 JEAN D'OR PRAIRIE (C)
- B5 MIKKWA-LOWER PEACE (F)
- B6 NOTIKEWIN (F)
- B7 KEG RIVER (C)
- B8 BUFFALO HEAD HILLS (F)
- B9 EAST PEACE (F)
- B10 RED EARTH (F)
- B11 PEERLESS-GRAHAM (F)
- B12 WABASCA (F)
- B13 SADDLE HILLS (F)
- B14 STURGEON LAKE-PUSKWASKAU EAST (C)
- B15 HEART RIVER (F)
- B16 UTIKUMA (F)
- B17 NORTH SWAN HILLS (F)
- B18 KAKWA-WAPITI (F)
- B19 SMOKY-SIMONETTE (F)

LOCAL PLANS
- B101 UPPER PEACE VALLEY (C)
- B102 LOWER PEACE VALLEY (C)
- B103 SMOKY-PEACE POINT (C)
- B104 GRANDE PRAIRIE COUNTY WEST (C)
- B105 WAPITI-GRANDE PRAIRIE SAND DUNES (C)
- B106 BEAR RIVER-WAPITI (C)
- B107 FROST HILLS (C)

NORTHEAST REGION C

NORTHEAST REGION REGIONAL PLAN (P)

SUBREGIONAL PLANS
- C1 FT. FITZGERALD (F)
- C2 CANADIAN SHIELD (F)
- C3 BIRCH MOUNTAIN-FIREBAG (F)
- C4 FT.McMURRAY-ATHABASCA OIL SANDS (P)
- C5 WINEFRED LAKE-PELICAN PORTAGE (F)
- C6 WANDERING RIVER-SMOKY LAKE (F)
- C7 BIG BEND (C,A)
- C8 LAKELAND (C,M)
- C9 COLD LAKE (P)

LOCAL PLANS
- C101 BEAVERHILL LAKE (C)

CENTRAL REGION D

CENTRAL REGION REGIONAL PLAN (P)

SUBREGIONAL PLANS
- D1 RED DEER RIVER CORRIDOR (F)

LOCAL PLANS
- D101 WHITE AREA FRINGE (F)
- D102 EDEN VALLEY (C)

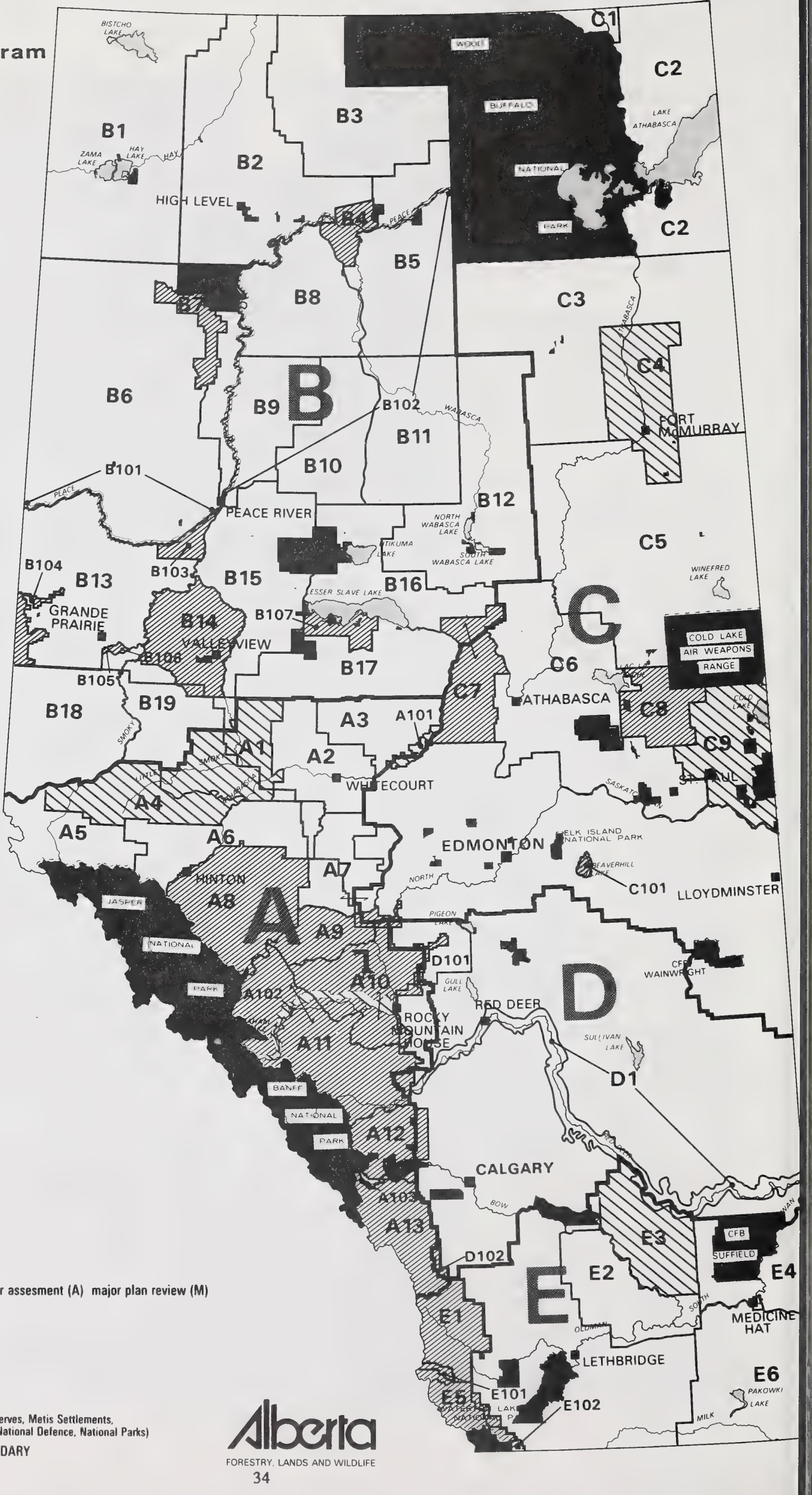
SOUTHERN REGION E

SOUTHERN REGION REGIONAL PLAN (P)

SUBREGIONAL PLANS
- E1 LIVINGSTONE-PORCUPINE HILLS (C)
- E2 OLDMAN-BOW (F)
- E3 EASTERN IRRIGATION DISTRICT (P)
- E4 CYPRESS NORTH (F)
- E5 CASTLE RIVER (C)
- E7 PAKOWKI-CYPRESS SOUTH (F)

LOCAL PLANS
- E101 CROWSNEST CORRIDOR (C)
- E102 POLL HAVEN (C)

completed (C) in progress (P) future (F) 5 year assesment (A) major plan review (M)



▨ COMPLETED PLANS

▧ IN PROGRESS PLANS

■ NON-PLANNING AREAS (Indian Reserves, Metis Settlements, Dept. of National Defence, National Parks)

— EASTERN SLOPES POLICY BOUNDARY

━ REGIONAL BOUNDARIES

FORESTRY, LANDS AND WILDLIFE

JULY 1991

Table 4-7
Status of Integrated Resource Management Plans for Alberta's Eastern Slopes (1992)

Region Label (see Figure 4-2)	**Subregion Name**	**Plan Status**
Peace River Region		
B18	Kakwa-Wapiti	Future
B19	Smoky-Simonette	Future
Eastern Slopes Region		
A1	Fox Creek-Knight	In Progress
A2 (small part only)	Whitecourt-Blue Ridge	Future
A4	Berland	In Progress
A5	Willmore Wilderness Park	Future
A6	Yellowhead North	Future
A7 (part)	Cold Creek	Future
A8	Coal Branch	Completed
A9	Brazeau-Pembina	Completed
A10	Rocky-North Saskatchewan	Completed
A11	Nordegg-Red Deer River	Completed
A12	Ghost River	Completed
A13	Kananaskis Country	Completed
A102 (local plan)	David Thompson Corridor	In Progress
A101 (local plan)	Athbasca River Sand Hills	In Progress
A103 (local plan)	Bow Corridor	In Progress
Central Region		
D102	Eden Valley	Completed
Southern Region		
E1	Livingstone-Porcupine Hills	Completed
E5	Castle River	Completed
E101 (local plan)	Crowsnest Corridor	Completed
E102 (local plan)	Poll Haven	Completed

"...we manage for self-sustaining populations as a priority over stocking programs."

"...we establish and obtain acceptance for population and habitat objectives for major wildlife groupings."

Fourteen more specific objectives were outlined, including the following, which relate to maintaining species and their habitat:

- To maintain and protect scarce species, restore threatened species, reintroduce extirpated species;
- To provide a variety of types and amounts of outdoor recreational opportunities;
- To strive for no net loss of quality of fish and wildlife habitat;
- To encourage the participation of other government agencies, the private sector and the public in the enhancement and development of fish and wildlife habitat;
- To retain, enhance, acquire and develop habitat for public benefit where species supply/demand shortfalls exist that are directly related to habitat quality/quantity (Alberta Forestry, Lands and Wildlife, 1989a).

Under the regulations of the Wildlife Act, wildlife, game bird, seasonal and corridor sanctuaries have been established to prevent disturbance of specific wildlife species in specific parts of the province, sometimes at particular times of the year. Generally, sanctuaries are intended to provide secure habitat for wildlife so that their populations can increase or stabilize. Sanctuary areas encompass areas of high habitat quality where wildlife have been disturbed or dispersed in the past. Sanctuary designation enables an area to support wildlife to its potential and thus act as a core production area from which the animals may disperse into neighbouring areas. Sanctuaries also provide people with an opportunity to view wildlife.

Habitat development areas are designated to protect indigenous wildlife habitat or areas that are being restored or enhanced for wildlife. They protect wildlife habitat, prevent disturbance to wildlife and protect the capital investments made by the province or private organizations and individuals to benefit the wildlife resource.

Legislation and Government Administration

Under Section 96 of the Wildlife Act, the Lieutenant Governor in Council may make regulations:

- Establishing wildlife sanctuaries and habitat development areas.
- Classifying wildlife sanctuaries into those for the benefit of all wildlife and those for prescribed kinds of wildlife.
- Regulating activities that would otherwise be permitted by the Crown under a permit.

These regulations must be renewed every three years or they cease to have force.

Under Section 97 the Minister is authorized to make regulations:

- Establishing migratory bird lure sites and wildlife control areas and specifying their purposes.
- Providing that areas are to be wildlife sanctuaries, habitat development areas, migratory bird lure sites or wildlife control areas only for prescribed parts of the year.
- Respecting the use, control and management of all or part of these designated areas.
- Respecting the access or exclusion of any persons to or from these designated areas.
- Respecting the posting of signs designating any area as one of the four types listed above.
- Respecting the protection of wildlife habitat and the restoration of habitat that has been altered, and enabling the Minister to order the person responsible for the alteration to restore the habitat and to charge that person with the cost of it if he has failed to effect the restoration.

Table 4-8
Sanctuaries for Wildlife and Habitat Development Areas, by Natural Region

Natural Region	**Wildlife Sanctuary (Site: area) (km²)**	**Habitat Development Area (Site: area) (km²)**	**Game Bird Sanctuary (Site: area) (km²)**	**TOTAL (NO. SITES: & AREA) (km²)**
Grassland				
Mixed		Antelope: 22.3	Many Island: 33.87 Pakowki Lake: 114.69	3 : 170.86
Parkland				
Central		McNabb: 0.81	Birch Lake: 29.02 Ministik Lake: 73.35 Miquelon Lake: 16.02	4 : 119.2
Foothills	Sheep River: 57.85			1 : 57.85
Foothills				
Main	Camp 1: 110.00	Ann & Sandy Cross: 8.1		2 : 208.10
Boreal Forest				
Peace R. Lowlands			Richardson Lake: 116.62	1 : 116.62
Mixedwood			Lac La Biche: 239.04	1 : 239.04
TOTAL No. Sites : Area	**2 : 167.85**	**3 : 31.21**	**7 : 622.61**	**12 : 821.67**

Distribution and Natural Region Representation

There are two wildlife sanctuaries in Alberta (see Table 4-8). The Sheep River Wildlife Sanctuary in Kananaskis Country is 58 km² in size and is found in the Foothills Parkland subregion. The most easterly of Alberta's bighorn sheep winter ranges, the sanctuary stays virtually snow free.

The Camp 1 Wildlife Sanctuary, located southwest of Hinton, is 110 km² in size and was designated in 1990 to prevent harassment and hunting of wildlife, particularly elk, deer and moose, that are beginning to use the regenerating forestland it supports. It is found in the Main Foothills subregion (Girvan 1991: pers. comm.).

There are seven game bird sanctuaries in Alberta (see Table 4-8) ranging in size from 16 to 239 km². Most were intended to provide a refuge for migratory waterfowl, and so include shorelands and islands. The two most southerly game bird sanctuaries in the Mixed Grassland contain ephemeral wetlands which, in recent dry years, have been dry for most of the year. In the Central Parkland, more than 60% of the Miquelon Lakes Bird Sanctuary protects upland habitat with 30% of the area represented by large waterbodies or potholes. More than 70% of the Miquelon Lake and Birch Lake sanctuaries protects open water habitat. More than 80% of the Richardson Lake sanctuary in the northeastern part of the Mixedwood Boreal Forest protects aquatic vegetation and open water areas, with the rest represented by shrublands and a few permanent potholes. Ninety-six percent, (230 km²) of the Lac La Biche sanctuary is open water (Markham 1991: pers. comm.).

There are also 49 restricted areas (lakes and rivers) where game bird hunting is restricted to part of the hunting season, usually only after November 1.

Seasonal sanctuaries are designated areas where human access is prohibited during critical periods of the year, usually April 15 to September 15 (Section 35 of the General Wildlife (Ministerial) Regulations). There are eight seasonal sanctuaries in Alberta to protect colonial nesting birds such as pelican and cormorants.

Other public lands in Alberta have Fish and Wildlife reservations that restrict the nature or timing of activity, for the purpose of minimizing disturbance to wildlife. For example, the Hay-Zama Lakes area, a valuable waterfowl nesting and staging area in northwestern Alberta, has specific management guidelines with respect to oil and gas activities. The perimeter of Beaverhill Lake in the Central Parkland has a wildlife reservation. These two sites are also internationally designated as RAMSAR sites (see Chapter 5).

Information on the Fish and Wildlife reservations across the province is not readily available.

Road corridor sanctuaries were added to the regulations in 1990, as a big game management strategy (Alberta Forestry, Lands and Wildlife 1990c). These are habitat areas along road right-of-ways that serve as travel corridors or feeding and resting areas for big game such as deer, elk, moose and sheep. These are usually defined as "within 400 yd. of the centre line" (Alberta Forestry, Lands and Wildlife 1990c) of a specified road from one location to another. A total of almost 500 km in 12 road corridor sanctuaries has been designated: seven in the southern part of the Eastern Slopes primarily to protect elk winter range areas, one in the northern part of the Eastern Slopes to reduce killing of woodland caribou and moose, and four in the Peace River boreal forest to protect moose (Glasgow 1991: pers. comm.).

Habitat development areas (HDA) are a protection mechanism more recently implemented by the Fish and Wildlife Division, to provide for the protection or enhancement of wildlife habitat. There are three in the province:

1. Ann and Sandy Cross Conservation Area is an 8.1-km² area of rolling Foothills Parkland terrain, located just southwest of Calgary. It supports healthy populations of elk and deer and was previously grazed by cattle (Simpson 1991: pers. comm.).

2. Antelope Creek Habitat Development Area is a 22.3-km² ranch in the Mixed Grassland subregion, just west of Brooks, containing more than 16 km² of native range, many wetlands and a variety of wildlife species. It was purchased as a "demonstration project" in the 1980s by a consortium of agencies including Fish and Wildlife Division, Wildlife Habitat Canada and Ducks Unlimited who saw a number of opportunities: habitat protection and development in an area where there was a serious decline in wetlands; integration of oil and gas development with habitat management; range management of native grasslands using deferred use by cattle on adjacent improved and irrigated pastures and "rotational use" of native pastures; and a broad range of recreational uses (Fitch 1991: pers. comm.).

3. McNabb Habitat Development Area is a 0.81-km² site located south of Vermilion in the Central

Parkland subregion. It consists of a creek valley with aspen parkland uplands. It supports the broad spectrum of native plant and animal species including puddle ducks, deer and grouse. Some of the uplands have been cleared and cultivated in the past, but these have been seeded and planted with shrubs and are being left to natural succession (Hamilton 1991: pers. comm.).

Protection and Management

Although all the sanctuary types have been established to protect wildlife (especially from hunting), in many cases it also means that activities that directly or indirectly degrade the habitat do not occur in the area. The sanctuary designation is a signal to other agencies that the area warrants special attention, and sometimes this means that it is left alone. Although some sanctuaries are fenced and posted, most are not. They are protected because most hunters consult current regulations that outline clearly where they cannot hunt and abide, for the most part, by these restrictions. Sanctuaries are monitored by Fish and Wildlife officers as part of their regular patrols in their regions.

A management plan for the Ministik Bird Sanctuary has been completed and the feasibility of doing plans for the other two in the Central Parkland is being examined.

Throughout the province molesting, disturbing or destroying the houses, nests and dens of all wildlife is prohibited year-round. Hunting, and possessing and discharging a weapon, are prohibited in wildlife, game bird and road corridor sanctuaries. The Sheep River Wildlife Sanctuary is zoned Critical Wildlife under the Eastern Slopes Policy and is subject to specific activity restrictions identified in the Kananaskis Country Integrated Regional Plan.

Entering or being within 0.8 km of a seasonal sanctuary is not allowed between April 15 and September 15.

Activities in habitat development areas are usually restricted by notice and may include or exclude a number of uses. People are not allowed to camp or be in habitat development areas between 11:00 p.m. and 4:00 a.m. Other activity restrictions may include: vehicles or horses, lighting fires, hunting or discharging a firearm, erecting a sign or poster. The Minister may authorize certain activities.

The Nature Conservancy of Canada (NCC) is responsible for the management of the Ann and Sandy Cross Conservation Area and will be establishing nature trails and offering outdoor education programs in 1991. The NCC is a national, nonprofit, charitable organization dedicated to the preservation of ecologically significant natural areas, unique natural features and places of special beauty. The Ann and Sandy Cross Conservation Area project is unusual for the Nature Conservancy of Canada, that usually facilitates the transfer or sale of lands, develops management plans and then delegates the stewardship of the land to nongovernment agencies (Simpson 1991: pers. comm.).

No hunting, horses, overnight camping or vehicle use are allowed on this site. There is one road into the property, and a parking lot. No other facilities are in place yet, but an interpretive centre is planned. Groups are encouraged to book in advance. The area is fenced to keep cattle in, but management in the future may preclude cattle (Simpson 1991: pers comm.).

Hunting is allowed in the Antelope Creek HDA . Public vehicular access is provided by two roads leading into the area. The area is extensively fenced to provide for cattle grazing of both native and nonnative pastures, and protection of aquatic and upland habitats. More than 130 cattle are grazed in the Antelope Creek HDA from May to the end of October on a rotation basis: first on an improved pasture, then on a 24 ha irrigated pasture, and then for one month each on three of four 400 ha native pastures (each year one pasture is left to "rest"). Fencing prevents cattle from damaging wetlands, shelterbelts and upland habitat areas. Ducks Unlimited will begin wetland enhancement activities in 1991. By ensuring a healthy grassland that is allowed to establish a certain height of cover each year, it is expected that the survival and productivity of the full spectrum of wildlife species will increase (Fitch 1991: pers. comm.).

Hunting, horses, vehicles and camping are not allowed in the McNabb HDA, which is fenced from the surrounding cultivated lands. The uplands have been cultivated to tame grass and shrubs, which are being left to natural succession. Some active management will be undertaken in the valley (Hamilton 1991: pers. comm.).

Future Considerations

There are no plans to designate new wildlife sanctuaries, game bird or seasonal sanctuaries. New corridor sanctuaries will be introduced after the effectiveness of those introduced in 1990 has been evaluated (Glasgow 1991: pers. comm.). As Alberta Fish and Wildlife Division completes management plans for individual sites, more habitat development areas (HDAs) will be proposed. These are an easier mechanism for designation (through Order-in-Council) and restriction of uses (through Ministerial regulations) compared to the older sanctuary designation, which is completely under the jurisdiction of the Lieutenant Governor. HDAs provide the greatest flexibility for the department in restricting or allowing uses. A number of North American Waterfowl Management Plan sites (see next section) will be added as HDAs over the next few years (Weatherill 1991: pers. comm.).

The Eastern Irrigation District, with more than 2,400 km^2 of native grassland, and the federal Prairie Farm Rehabilitation Administration (PFRA) are setting up a range management system similar to the one in the Antelope Creek HDA (Fitch 1991: pers. comm.).

Other Wildlife Habitat Programs

In the past 50 years there have been a number of initiatives at local, provincial, national and international levels to address the continuing loss of wildlife habitat, particularly in the settled parts of western Canada. In many cases, little distinction has been made between "protection of indigenous ecosystems" and "habitat enhancement." Many projects are a combination of both, often involving relatively small parcels of land. Another distinguishing feature of many of these programs is the emphasis on the involvement of private landowners and organizations. Some of the programs that provide for protection of representative examples of Alberta's natural ecosystems are described below.

Alberta Fish and Wildlife Division has embarked on several programs that focus on wildlife management and species protection (Posey 1992). These include: restoration of threatened species through public education; cooperative recovery plans for endangered or threatened species such as the peregrine falcon, whooping crane, piping plover, ferruginous hawk and burrowing owl (see Alberta Energy and Natural Resources 1985); monitoring and studying of scarce species; and development of provincial plans. Draft plans have been completed for the loggerhead shrike, western blue flag (a threatened plant species), elk, antelope, bighorn sheep, cougar, wolf, black bear, moose and mountain goat. Plans for mule deer and grizzly bear have been completed and published (Markham 1991: pers. comm.)

The Buck for Wildlife program is administered by Fish and Wildlife Division, under the Fish and Wildlife Trust Fund Regulation of the Wildlife Act. It is primarily funded by fees from licences, permits and certificates supplemented by private donations. This program provides funds for Fish and Wildlife Division or private organizations to protect or enhance wildlife and fish habitat. This includes such activities as: fencing of trout streams to prevent cattle from damaging them, aerating small lakes to prevent fish winterkill, planting shelterbelts to provide upland game bird food and shelter, developing or stabilizing wetlands using water control structures, constructing various nesting structures for waterfowl and birds of prey, harvesting stands of old growth timber to open up forest areas to allow grasses to flourish, burning forest lands to promote elk winter range, and seeding and fertilizing cleared areas to promote grass production (Alberta Forestry, Lands and Wildlife 1986b).

Since the 1960s Alberta Fish and Wildlife has acquired private lands that contain or affect high priority fish and wildlife habitat, provide habitat that is in short supply or have habitat development potential. Most of the land bought has been for the various programs described in this section (Alberta Forestry, Lands and Wildlife n.d.).

The goal of the North American Waterfowl Management Plan (NAWMP), a joint $1 billion, 15-year Canada/U.S. management program, is to restore North American waterfowl populations to levels of the 1970s, by promoting ecologically sound soil and water management practices. It has set specific waterfowl species population targets and strategies to protect waterfowl habitats.

A major component of the NAWMP is the Prairie Habitat Joint Venture, which focuses on acquiring, preserving and enhancing habitat in the prairie provinces of Canada. The prairie pothole region of Canada and the United States has the highest priority of the 32 regional habitat priorities (Posey 1992). In Alberta, almost $600 million will be spent, primarily in the Central Parkland, to pay incentives to farmers to enhance nesting opportunities (e.g., planting nesting cover, erecting nesting structures), retire land from agricultural production, change land management techniques, build feeding stations and undertake other conservation measures (Environment Canada and United States Fish and Wildlife Service 1986).

Alberta Fish and Wildlife is involved in a number of joint-venture programs that contribute to habitat retention or enhancement, but which often do not involve public land ownership and management. These include the Landowner Habitat Retention

Program, Riparian Habitat Program, Wetlands for Tomorrow, Prairie for Tomorrow and the Prairie Conservation Action Plan.

The Landowner Habitat Retention Program, initiated as a pilot project in 1986, is designed to provide financial and other incentives to private landowners (through formal agreements) willing to retain wildlife habitat on their lands and encourage land use changes that benefit wildlife. To be eligible, habitat areas must meet certain criteria with respect to size, location, quality and land use. For example, critical winter habitat for deer requires continuous blocks of cover of 0.3 km^2 or greater—this requirement may be less if it is close to a larger block. Waterfowl habitat areas must contain sufficient water to attract and keep waterfowl until the end of the nesting season. Funding is provided by Wildlife Habitat Canada and Buck for Wildlife (Alberta Forestry, Lands and Wildlife n.d.; Posey 1992).

In a similar way, the Riparian Habitat Program, initiated by Alberta Fish and Wildlife Division in 1988, with funding support from Wildlife Habitat Canada and Fisheries and Oceans Canada is intended to preserve riparian habitat on private lands by providing various financial incentives to landowners. (Wildlife Habitat Canada is an independent foundation established in 1983 committed to the retention and stewardship of land areas that support wildlife.) A Buck for Wildlife pilot project designed to secure important wetlands and increase landowners' awareness of the needs of waterfowl has also been initiated.

Under the Wetlands for Tomorrow program, Fish and Wildlife Division has also been involved in joint wetland conservation and development projects with Ducks Unlimited, a private, nonprofit international conservation organization that strives to preserve, restore, develop and maintain prime wetland habitat. (Since 1938 Ducks Unlimited has spent about $22 million on more than 600 wetland projects in Alberta, affecting thousands of km^2 of waterfowl habitat.)

The Prairie for Tomorrow is a three-year joint venture program between Alberta Fish and Wildlife and the World Wildlife Fund to fund projects oriented toward the protection of critical prairie and parkland habitats and endangered species. The program has three components: (1) public communication and awareness especially for landowners; (2) development of species management plans for all endangered species in the province; and (3) various initiatives to protect habitat areas in conjunction with voluntary participation of private landowners.

The Prairie Conservation Action Plan is a joint program of the three prairie provinces, the federal government and various nongovernment organizations, including the World Wildlife Fund (see World Wildlife Fund n.d.). It provides a blueprint for conservation and management efforts to protect native prairie and parkland species, communities and habitats. Its goals include:

1. Identifying all remaining native prairie and parkland areas;
2. Protecting at least one large, representative area in each of the major prairie ecoregions, including mixed and northern fescue grasslands and aspen parkland in Alberta;
3. Establishing a system of protected areas representing native prairie ecosystems and where possible connecting corridors across the three prairie provinces;
4. Protecting threatened habitats and areas supporting examples of natural ecosystems by preparing and implementing habitat management and restoration plans; and
5. Protecting and enhancing populations of prairie species designated as threatened, endangered or extirpated and ensuring that no additional species become threatened, endangered or extirpated (Prairie Conservation Coordinating Committee 1990a, 1990b).

Other goals identified include general policy initiatives relating to coordination, public education and research.

Distribution and Natural Region Representation

Between 1973 and 1989, the Buck for Wildlife program has spent approximately $16.7 million on over 450 projects, mostly in areas where human activity has threatened, damaged or destroyed fish and wildlife habitats. This included $5.5 million for 153 lake habitat improvement projects affecting 170 km^2; $1.7 million for 116 projects to enhance 220 km of trout stream habitat; $1.3 million for 92 projects to improve 100 km^2 of big game habitat and $1.9 million for 145 projects to develop and secure habitat for waterfowl and upland game birds (Alberta Forestry, Lands and Wildlife 1989b). More than $2.1 million has been given as grants to various organizations for 273 habitat improvement projects. A summary of the extent and location of these projects is unavailable. Generally these projects are less than 1 km^2 in size and involve activities to enhance wildlife habitat and protect it from further human impact.

Table 4-9
Interjurisdictional Fish and Wildlife Project Areas, by Natural Region

Natural Region	**NAWMP***	**Landowner (L)/ Riparian (R) Habitat**	**Prairie (P)/ Wetlands (W) for Tomorrow**	**TOTAL (NO SITES: AREA)**
		(No. sites: Total Area - km²)		
Grassland				
Mixed			3 : 9 (W)	3 : 9
Northern Fescue			1 : 5 (P)	1 : 5
Foothills				
Parkland				
Central	1 : 850	1:31(R)	3 : 179 (W)	5: 1,060
Foothills				
Peace R.				
Boreal Forest				
Subarctic				
Hay R.				
Peace R. Lowlands				
Mixedwood			1 : 10 (W)	1 : 10
TOTALS	**1 : 850**	**278 : 163 (L)*** **1: 31 (R)**	**7 : 198 (W)** **1 : 5 (P)**	**288 : 1,247**

*breakdown by natural region not available

In 1989, Alberta's First Step Project of the North American Waterfowl Management Plan was initiated: the 850-km² Buffalo Lake Moraine project surrounding Buffalo Lake in the Central Parkland subregion of east central Alberta (Ewashchuk 1991: pers. comm.).

Under the Landowner Habitat Retention Program, as of December 31, 1990, a total of 163 km² of wildlife habitat have been retained and 278 agreements signed with landowners. These projects have been concentrated in the counties of Minburn (Mixedwood Boreal Forest), Red Deer (Central Parkland), Bow River Irrigation District (Northern Fescue Grassland) and Eastern Irrigation District (EID) (Mixed Grassland). In the Eastern and Bow River Irrigation Districts, 23.1 km² of wetland and upland habitat have been secured and developed. Information on the size and distribution of these parcels is unavailable (Alberta Forestry, Lands and Wildlife n.d.).

The program has been expanded into northeastern Alberta in the municipalities of Barrhead, Strathcona and Parkland but details are not available.

A three-year pilot project under the Riparian Habitat Program is under way on the lower and middle reaches of the Battle River in Central Parkland subregion. As of November 30, 1991, 42 km² of lands adjacent to and upland of the Battle River and its tributaries are under 65 separate agreements that pay landowners up to 80% of rental rates for that area (annual total payment is about $30,000.). About half the area involved is upland (Olson 1991: pers. comm.).

A total of 20 wetlands under the Wetlands for Tomorrow program will be secured and managed for waterfowl production. Several of those that have been completed or are planned involve reclaiming wetlands associated with lakes that have been partially drained for agricultural purposes.

To date seven have been completed (Brumen 1991: pers. comm.) including:

Beaverhill Lake (Central Parkland) – waterfowl habitat enhancement projects based on land use plans for each Crown land disposition around the lake (130 km²).

Big Lake and Bittern Lakes (Central Parkland) – water level stabilization for waterfowl production (30 km²).

Kleskun Lake (Mixedwood Boreal Forest) – integrated wetland management plan for lake and extensive floodlands that are part of the Kleskun

Lake Grazing Reserve, implementation of water control and manipulation to increase and enhance waterfowl habitat (10.1 km²).

Stirling Lake (Mixed Grassland) – integrated management plan for lake involving waterfowl habitat enhancement measures such as flood control, water level manipulation and provision of assured supply of fresh water to lake (2.02 km²).

Tyrrell and Rush Lakes (Mixed Grassland) – water management plan involving stabilization, ditching, construction of a canal, nesting islands (3.24 km²).

Vauxhall Marsh Complex (Mixed Grassland) – waterfowl management plan that minimizes flooding and enhances waterfowl production (4.04 km²).

Whitford and Rush Lakes (Central Parkland) – stabilization of complex and acquisition of adjacent lands and uplands for waterfowl production (18.62 km²).

One project in the Prairie for Tomorrow program has been initiated: fencing of shoreland of Little Fish Lake, southwest of Hanna, in the Northern Fescue Grassland subregion, to protect piping plover habitat. This protects an area of about 4 km² (Packham 1991: pers. comm.).

No specific projects or plans have been implemented as a result of the Prairie Conservation Action Plan.

Protection and Management

Some Buck for Wildlife projects are fenced and signed, and access opportunities vary. The majority are monitored and regularly maintained, either by Fish and Wildlife officers or members of organizations involved in the projects. Hunting is allowed in most project areas (Olson 1991: pers. comm.).

It should be noted that in addition to fisheries habitat protection and enhancement projects, Alberta Fish and Wildlife, under the Wildlife Act (Alberta) regulates and restricts the harvest of fish by timing the fishing seasons and closing areas completely to fishing. These measures are outlined in the annual fishing regulations. Under the federal Fisheries Act, Fish and Wildlife may prosecute people undertaking activities that have a deleterious effect on the aquatic environment. Fish and Wildlife also provides guidelines for development activities through an interagency referral system (e.g., timing constraints regarding stream crossings). The province is also involved in fish stocking of lakes and streams, both on an annual basis and for the purposes of establishing self-sustaining populations. There are very few rivers and lakes in the province that do not have introduced fish species (Zelt 1990: pers. comm.).

Alberta Fish and Wildlife staff are responsible for managing recreational fisheries to meet the objectives of Canada's Policy for Recreational Fisheries. These include conserving, restoring and enhancing recreational fisheries and their habitats (Swinnerton 1991:70).

The North American Waterfowl Management Plan's $2 million Buffalo Lake Moraine project covers an area of 850 km². It has four basic programs: (1) purchasing 10 km² of marginal cropland and converting it to dense nesting cover; (2) providing incentives for farmers to chemfallow (leaving the stubble in place and controlling weeds using herbicides) 24 km² of land adjacent to wetlands, thus providing improved nesting habitat for waterfowl such as pintail; (3) providing incentives for farmers to underseed 8 km² of upland cropland with legumes, which the next spring form dense cover for late nesters; and (4) building more than 150 small nesting islands in wetlands in the project area. A crop damage control bait station was built in 1989.

All purchased lands are signed and fenced. There is no restriction on fall hunting. Only foot access is allowed to the sites and limited use is recommended during the nesting season.

Some agreements signed as part of the Landowner Habitat Retention Program require fencing and signing.

Most riparian lands under agreement in the Riparian Habitat Program are in natural condition and reserved for exclusive wildlife use. The upland areas are either kept in a natural condition for exclusive wildlife use or are managed for compatible use by wildlife, such as with reduced cattle grazing or delayed grazing and cultivation. Most of the lands under agreement are not signed, at the landowner's request (Olson 1991: pers. comm.).

The Wetlands for Tomorrow projects are similarly fenced and signed as for Buck for Wildlife project areas.

The Prairie for Tomorrow project at Little Fish Lake involves fencing of the lake shoreland to protect piping plover habitat on the beach from damage by cattle. Dugouts have been built to supply water for the cattle fenced out from the lake. Nesting poles for ferruginous hawks have been erected in the Many Islands Grazing Reserve south of Medicine Hat (Brechtel 1991: pers. comm.). This program is also funding an inventory to determine the distribution and status of cottonwoods in southern Alberta riparian habitats. (A similar study was commissioned by Alberta Environment on cottonwood habitats on the Milk River, Brechtel 1991: pers. comm.).

Participation or knowledge of the Prairie Conservation Action Plan has encouraged agencies to examine the status of prairie and parkland ecosystems within their jurisdictions. For example, some planning commissions and municipalities in Alberta have initiated Environmentally Sensitive Area inventories (several others have already completed them). Jurisdictions with tax recovery lands are adjusting their sale policies to reflect ecosystem preservation and conservation values and not just agricultural values (Dyson 1991: pers. comm.).

Future Considerations

The 1991-92 Buck for Wildlife program will provide $1.1 million for 49 fisheries related projects and $1.3 million for 51 wildlife related projects (Olson 1991: pers comm.).

Annual maintenance of nesting islands and other improvements will be required for the NAWMP Buffalo Lake Moraine Project. Waterfowl production will be monitored every two years. In 1991-92 six new projects will be initiated in the moraine areas of the Central Parkland subregion, characterized by numerous permanent and temporary wet depressional areas. These will be located near Derwent, Tofield, Wainwright, Camrose and Red Deer (two areas). In each, a small portion of the landbase would be purchased to form the focus of management efforts, and surrounding these areas farmers would be encouraged to adopt compatible land management measures. The cost of the 1991-92 program is between $16 and $17 million, with $1.6 million paid by Alberta (Ewaschuk 1990: pers. comm.; Weatherill 1991: pers. comm.).

There are plans to expand the Landowner Habitat Retention Program provincewide but it will concentrate on habitats other than those for waterfowl as the waterfowl component will be assumed by the NAWMP.

There are no immediate plans to expand the Riparian Habitat Program.

Thirteen Wetlands for Tomorrow projects will be assumed by the NAWMP program. These include:

Ben-Watt Lakes (Central Parkland) – protecting deterioration of waterfowl habitat (8.7 km^2).

Big Lake (Central Parkland) – integrated management plan to coordinate waterfowl enhancement activities and recreational use as well as resolve land use conflicts posed by expansion of housing developments from St. Albert and implementation of waterfowl production enhancement measures (24.28 km^2).

Buffalo Bay Lake/Heart River Complex (Mixedwood Boreal Forest) – independent regulation of this complex, separate from the water levels of Lesser Slave Lake (106.3 km^2).

Buffalo and Spotted Lakes (Central Parkland) – integrated management plan for Buffalo Lake that recognizes waterfowl, recreational and agricultural uses, and waterfowl habitat and enhancement measures implemented (80.8 km^2).

Chip Lake (Mixedwood Boreal Forest) – development of a habitat management plan for the enhancement of waterfowl populations and implementation of enhancement measures (70.7 km^2).

Cygnet Lake (Central Parkland) – comprehensive waterfowl enhancement plan and enhancement activities (8.1 km^2).

Hay-Zama Lakes (Hay River Boreal Forest) – waterfowl enhancement plan and implementation, including water level manipulation (113.32 km^2).

Little Red Deer Marsh (Central Parkland) – habitat enhancement through water control and assured water supply (2.1 km^2).

Manawan Lake (Mixedwood Boreal Forest) – waterfowl management planning that includes land acquisition, reservations on surrounding lands and possible water control modifications and compartmentalization of lake to raise water levels (10.21 km^2).

Many Island Lake (Mixed Grassland) – waterfowl habitat enhancement through control and manipulation to moderate the extreme fluctuations of the complex and other measures such as ditching and compartmentalization (20.23 to 48.56 km^2).

Marion Lake (Central Parkland) – conversion of this sometimes-dry lake into a permanent one to enhance waterfowl production of the area (19.71 km^2).

Peace-Athabasca Delta (Peace River Lowlands Boreal Forest) – comprehensive management plan to coordinate wetland management activities of the federal and provincial government agencies and other organizations, to optimize habitat enhancement. (3480.29 km^2).

Utikuma Lake (Mixedwood Boreal Forest) – enhancement of waterfowl production (339.94 km^2).

The Prairie for Tomorrow program may be involved in assisting with native grassland management and fencing in the Special Areas of southeastern Alberta (Mixed Grassland). A conservation plan for the riparian cottonwoods on southern Alberta rivers is being completed. The program is also studying the ecology of tax recovery lands in southern Alberta and classifying wetlands of the aspen parkland.

Willmore Wilderness Park

Willmore Wilderness Park (Figure 4-3), named after Norman Willmore, a former minister of Forests and Wildlife, was established in 1959. Located west of Grande Cache and directly north of Jasper National Park, this wilderness park contains several outstanding natural features, such as high mountains, rolling foothills and a network of rivers. It supports a wide diversity of flora and fauna. This diversity, combined with a very low level of development and prohibition of motorized vehicles, makes Willmore especially suitable for those who enjoy backcountry travelling and isolation from the hustle and bustle of civilization.

Unlike other legislated wilderness areas in Alberta, Willmore is the only one in which hunting, trapping and fishing are allowed—humans participate directly in its ecosystems as a predator, but one that does not stay in the area. Pachal (1992) points out that Willmore Wilderness Park is the only established wilderness area which, through legislation, allows recreational uses considered compatible with wilderness preservation.

> *Only Willmore allows visitors to return to a wilderness environment with the opportunity to live the way their ancestors did (Alberta Forestry, Lands and Wildlife 1988f: 9).*

Section 3 of the Willmore Wilderness Park Act (RSA 1980) states the park's purpose:

> *The park is dedicated to the use of the people of Alberta for their benefit, education and enjoyment, subject to this Act and the regulations, and shall, by the management, conservation and protection of its natural resources and by the preservation of its natural beauty, be maintained for the enjoyment of future generations.*

Legislation and Government Administration

The Alberta Forest Service, Alberta Forestry, Lands and Wildlife, administers the park through the Willmore Wilderness Park Act (WWP Act) and its regulations. The Act grants the Lieutenant Governor in Council (cabinet), with respect to the park, the power to override such Acts and accompanying regulations as the Public Lands Act, the Forests Act and the Wildlife Act (WWP Act, Sec. 7). Willmore Wilderness Park is managed according to the Eastern Slopes Policy (Alberta Energy and Natural Resources 1984a).

The Act gives the Lieutenant Governor in Council the authority to increase or decrease the size of the park (without public debate or discussion in the legislature).

The Forest Land Use and Management Regulations of the Forests Act apply to activities in the park. Some of the more significant clauses are:

1. Motor vehicles are prohibited without the permission of the Minister of Forestry, Lands and Wildlife (Forest Land Use Reg. Sec. 3).
2. Unless official permission is granted, no person is allowed to:
   (a) injure, disturb or remove any live tree, mineral, rock or soil, in the park, or
   (b) erect a structure other than a tent in the park (Forest Land Use Reg. Sec. 8).
3. Hunting, fishing, trapping and the use of horses for trail riding are permitted.

Mining activities are permitted throughout the park (WWP Act, Section 6).

Under the authority of the federal Aeronautics Act, a 1966 order prohibits aircraft from landing or taking off in the park, without permission. A 1978 amendment to the Boating Restriction Regulations of the Canada Shipping Act eliminates all motorized boat use on the Smoky and Berland rivers in Willmore Wilderness Park. Other regulations relating to visitor use that are relevant to the Willmore are found in the Forests Act, Public Lands Act, Forest and Prairie Protection Act and Litter Act.

Distribution and Natural Region Representation

Alberta's Willmore Wilderness Park is 4,597 km² in area, and covers parts of the Alpine and Subalpine subregions of the Rocky Mountain Natural Region. Pine forests dominate the ridges of the foothills region in the eastern corner of the park with open grasslands bordered by trembling aspen on the southwest facing slopes—these provide excellent winter range for sheep and goats. The Rocky Mountain ranges increase in height from 300 m in the northwestern part to over 1,500 m in the southwest where the park boundary is also the Continental Divide. A number of peaks along the Continental Divide exceed 3,060 m in elevation. The headwaters of the park along the southern and western bounda-

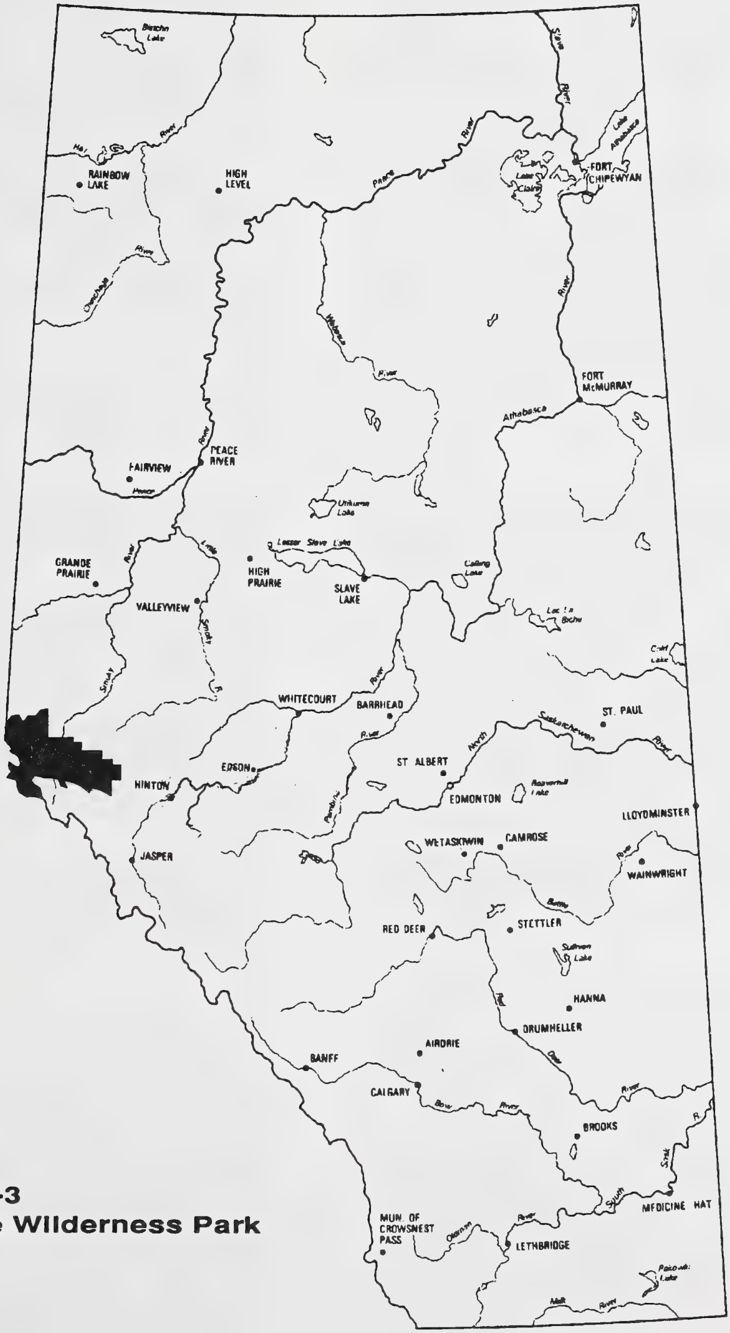


Figure 4-3
Willmore Wilderness Park

ries have broad grassy flats across the valley bottoms with subalpine forests of lodgepole pine and white spruce. Fir is the dominant tree near the treeline. The alpine meadows are important summer range for many ungulates that graze on the grasses, sedges and mosses.

Of the six major rivers in the park, all but one originates in the park. The eastern rivers are relatively small but the western rivers are impossible to ford safely. Glaciers are still present on some of the high mountains of Willmore.

The park supports a wide diversity of flora and fauna, including moose, elk, caribou, Rocky Mountain bighorn sheep, mountain goat, white-tailed and mule deer, black and grizzly bear, coyote, wolf and cougar as well as a wide variety of small mammals, grouse, ducks, geese, predatory and forest birds and a few species of sport fish.

Protection and Management

Willmore Wilderness Park provides considerable protection of natural features and native plants and animals because of its relatively large size, limited access, low level of development (no roads or facilities in the park area) and prohibition of motorized vehicles and boats. Since the park encompasses parts of both the Alpine and Subalpine subregions, it supports a wide diversity of wildlife.

Unfortunately, since 1959 more than 17% of Willmore's original area of 5,566 km^2 has been removed from protected status for coal exploration and development. This area was once wintering range for bighorn sheep, elk and mountain caribou. The number of mountain caribou has plummetted to 300 from more than 1,200 in the 1950s (Pachal 1992).

There are only three major access points into Willmore Wilderness Park: Hell's Gate, a staging area; and Big Berland River from Highway 40 and Rock Lake, near Hinton, both Alberta Forest Service recreation areas. Access is only by foot or horses. There is voluntary registration, with about 180 surveys completed per year. Thirty-three percent of users are local people, 57% are Albertans and the rest are from out-of-province. More than half the users are hikers or mountain bikers and 43% are on horseback. Several backcountry trails continue beyond the park boundaries, to the north and west (Rodseth 1990: pers. comm.).

There are no public facilities in Willmore Wilderness Park—a few primitive campsites have been cleared, but without any development. There are 750 km of horse and hiking trails, which are minimally maintained by the Alberta Forest Service (AFS) (Rodseth 1990: pers. comm.).

Fish and Wildlife and AFS personnel patrol the park on a regular basis on foot, or by horse or helicopter. Some habitat management has been undertaken by Fish and Wildlife; for example, setting fires to improve elk habitat. When necessary, AFS will send crews into the park to suppress forest fires. There are six cabins located throughout the park for the patrols or work crews to use (Rodseth 1990: pers. comm.).

Twelve commercial trail riding companies are licensed to operate in the park. Each operator must submit an annual operating plan, indicating the schedule and places of movement throughout the park. Commercial trail riding data indicate that about 45 trips per year are made, averaging seven days per trip and 2,796 user days per year (Alberta Forestry, Lands and Wildlife 1988f).

The park supports nine active traplines for such furbearing animals as marten, squirrel, wolf, lynx and coyote. Snowmobile use by trappers is allowed by permit from the Alberta Forest Service where it is justified.

Although mining is allowed under the Willmore Wilderness Act, there has been no mineral exploration in Willmore for many years due to the restriction on motorized vehicle use.

A management plan is being developed for Willmore Wilderness Park. The park is zoned Prime Protection under the Eastern Slopes Policy.

Future Considerations

There are no other areas in Alberta under consideration for wilderness park designation.

Forest Land Use Zones

As the demands to utilize the resources of the Green Area have increased, Alberta Forestry Lands and Wildlife has designated Forest Land Use Zones, to reconcile land use conflicts and provide protection. These are environmentally sensitive areas with site-specific limitations for use.

Forest Land Use Zones have a dual purpose:

1. To protect areas containing sensitive resources such as wildlife and their habitats, vegetation, soils and watershed; and

2. To separate or control conflicting recreational activities (Alberta Forestry, Land and Wildlife 1987e, 1988b).

Legislation and Government Administration

Forest land use zones are managed by the Alberta Forest Service according to Section 46 of the Forests Act, and its pursuant regulations, the Forest Land Use Zone, Forest Recreation Area and Forest Recreation Trail Regulations (AR 343/79) and subsequent amendments (AR 311/87). According to the Forests Act:

- The Lieutenant Governor in Council may make regulations declaring any area of forest land to be a forest land use zone (Part 3 Sec. 46a).
- The levels of control in these zones may include:
  - (a) complete exclusion of motorized and/or nonmotorized activities, including recreational, industrial and commercial
  - (b) restriction of motorized activities to designated trails or travel corridors
  - (c) exclusion of motorized and nonmotorized activities from certain highly sensitive areas in a zone
  - (d) authorization of motorized and/or nonmotorized activities during certain seasons.

Distribution and Natural Region Representation

There are 10 forest land use zones in Alberta covering 5,643 km², ranging in size from 41 km² to the well-known, 3,153-km² Kananaskis Country Forest Land Use Zone. All the established forest land use zones fall within the Eastern Slopes of Alberta, representing 6.3% of the 90,000-km² Eastern Slopes region. Several of the Eastern Slopes zones, for example, Prime Protection, Critical Wildlife and Multiple Use, as set out in the Policy for Resource Management of the Eastern Slopes, may coexist in the same forest land use zone. The distribution of forest land use zones is summarized in Table 4-10.

Table 4-10
Distribution of Forest Land Use Zones in Alberta, by Natural Region

Natural Region	TOTAL (No. Sites: Total Area) (km²)	Name of Forest Land Use Zone
Foothills		
Main	4 : 1,134	McLean Creek Off-Highway Sibbald Snow Vehicle Panther Corners Upper Clearwater
Rocky Mountain		
All Three Rocky Mountain Subregions: Montane, Subalpine & Alpine	3 : 4,121	Kananaskis Country Cataract Creek Snow Vehicle Blackstone-Wapiabi
Two Rocky Mountain Subregions: Subalpine & Alpine	3 : 988	Job Lake Wild Kakwa Allison/Chinook
TOTAL	**10 : 6,243**	

Protection and Management

Forest land use zones (FLUZ) are not zoned internally. The regulations pertaining to each FLUZ can permit, restrict or prohibit specific uses to meet the objectives of the zone. Of the 10 FLUZ, six permit or restrict motorized vehicle use (off-road vehicles or snow vehicles) and four prohibit motorized vehicles. In the same four zones where vehicles are prohibited, grazing or tethering of horses within 100 m of lakes and streams is not allowed, to prevent shoreline degradation and water contamination. Horse owners may be required to bring feed to prevent overgrazing of wildlife forage areas by horses.

Motorized vehicles are allowed in restricted areas if they are being used for emergencies, for government resource management activities, for special research, for trapping (in registered trapping areas) and for industrial activities as permitted under disposition by the Minister of Forestry, Lands and Wildlife. The use of helicopters is also allowed.

Hunting, fishing, camping, hiking, canoeing and cross-country skiing are encouraged throughout the zones. Horse use is also allowed within the limitations identified. In some zones facilities and trail development may exist. For example, in the Allison/Chinook FLUZ, cross-country ski trails have been constructed.

Forest land use zones are regularly patrolled by Alberta Forest Service personnel (and in some cases Fish and Wildlife staff). Charges for violations of the regulations are made under regulations AR343/79 (under the Forests Act).

Most forest land use zones access points are signed.

Future Considerations

Forest land use zones can be established throughout the Green Area of Alberta. Other FLUZ have been proposed, including the woodland caribou habitats in the Prairie Creek area north of Willmore Wilderness Park, and the Athabasca Sand Dunes, south of Lake Athabasca. The current policy of the Department of Forestry, Lands and Wildlife is that new forest land use zones will be created only if supported by an approved integrated resource plan for that area. Pachal (1992) suggests that FLUZs could be used to protect river and trail corridors.

Changes to the use limitations for an established forest land use zone can be made only through an Order-in-Council.

Wildland Recreation Areas

The concept of a Wildland Recreation Area is not new. The report of the 1974 Eastern Slopes public hearings recommended that wildland recreation areas be established in each of five Eastern Slopes river basins (Bow, Red Deer, North Saskatchewan, Athabasca and Smoky) (Pachal 1992). It refers to an area that allows recreational activities considered compatible with wilderness values, similar to those uses allowed in Willmore Wilderness Park. This differs from designated wilderness areas in which hunting, fishing and horse travel are not allowed. Since the declaration of Alberta's three wilderness areas in 1971, wilderness recreationists have been reluctant to propose new wilderness areas because of these restrictions (Pachal 1992).

Wildland recreation area is a recent designation by Alberta Forestry, Lands and Wildlife to refer to portions of the Green Area in which management primarily for wilderness recreation is coordinated by the Alberta Forest Service. Within a wildland recreation area there may be one or more other types of legally protected or restricted use areas such as wilderness areas, ecological reserves, natural areas, forest land use zones or AFS recreation areas.

Wildland recreation areas are managed by AFS to "provide high-quality, extensive backcountry recreation experiences while protecting the environmentally sensitive watershed, fisheries, wildlife, ecological and wildland resources" (Alberta Forestry, Lands and Wildlife 1986d).

Legislation and Government Administration

The designation of wildland recreation area has no legislative authority. It does provide a backcountry recreation management focus to an area and a more comprehensive basis on which to plan and administer the area.

Distribution and Natural Region Representation

There are two wildland recreation areas in Alberta: the Bighorn Wildland Recreation Area, west of Nordegg, formally designated in April 1986 as part of the Nordegg-Red Deer Integrated Resource Plan; and the Wild Kakwa Wildland Recreation Area, west of Grande Cache, named in 1987.

The Bighorn Wildland Recreation Area covers approximately 3,966 km^2 mostly in the Rocky

Mountain Alpine/Subalpine terrain, with about 15% Montane and another 20% Main Foothills.

The Wild Kakwa covers 647 km² of the Rocky Mountain Alpine and Subalpine natural subregions.

Protection and Management

The Bighorn Wildland Recreation Area encompasses four forest land use zones (Blackstone-Wapiabi, Job Lake, Upper Clearwater and Panther Corners), one ecological reserve (Kootenay Plains), one natural area and a number of Alberta forest recreation areas (Alberta Forestry, Lands and Wildlife 1987b). All of the Wild Kakwa is a forest land use zone so activities are restricted to the extent outlined in specific regulations that permit motorized vehicles only on designated trails and regulate vehicle and horse use in critical wildlife areas, especially during calving season (see Appendix C for forest land use restrictions).

Pachal (1992) states that without formal establishment of boundaries and regulations specific to these areas, wildland recreation areas remain legally unprotected.

Future Considerations

Management plans are being prepared for both wildland recreation areas. While the Bighorn Wildland Recreation area was identified in the Nordegg-Red Deer Subregional Integrated Resource Plan completed in 1986, the Wild Kakwa area is part of the Kakwa-Wapiti subregion, for which there is no plan.

It is not expected that any new wildland recreation areas will be established in the near future. The Alberta Wilderness Association has identified 11 wilderness areas (totalling 17,927 km²), which require legislated protection either as wildland recreation areas or even natural areas (Pachal 1992).

Forest Recreation Areas

The Alberta Forest Service of Alberta Forestry, Lands and Wildlife, as primary resource managers of the province's forest lands, has the responsibilities for providing protection and administration of recreation areas in the Green Area (see Alberta Energy and Natural Resources 1982a). Forest Recreation Areas and Forest Recreation Trails have been developed to concentrate specific outdoor recreational activities in designated areas (see Alberta Forestry, Lands and Wildlife 1988a).

In 1988-89 more than 2.1 million residents and tourists took advantage of the facilities and services provided under the forest recreation programs of the AFS including camping at more than 200 forest recreation area campgrounds, using more than 800 km of trails maintained for snowmobiling, cross-country skiing, trail riding and off-highway vehicle use, and travelling thousands of backcountry hiking trails.

Legislation and Government Administration

Forest recreation areas and recreation trails are managed by the Alberta Forest Service according to Section 46 of the Forests Act, and its pursuant regulations, the Forest Land Use Zone, Forest Recreation Area and Forest Recreation Trail Regulations (AR 343/79) and subsequent amendments (AR 311/87).

Distribution and Natural Region Representation

There are 181 forest recreation areas (Alberta Forestry, Lands and Wildlife 1991a), throughout Alberta, ranging in size from less than 1 km² to 15 km². These include 25 small, remote backcountry campsites accessible only by foot, horse, all-terrain vehicle or air; 76 trailhead and staging areas; 24 day-use picnic sites; 89 auto-accessible campgrounds and 21 group sites (Table 4-11). There are 235 separate reservations placed to protect these areas. There may be up to three reservations for one location, for example for auto-accessible campground, staging area and group camping area (Jones 1991: pers. comm.).

As shown in Table 4-11, 38% of forest recreation areas are auto-access campgrounds, 23% are staging areas (small campground or parking areas at trailheads), 11% are small remote or backcountry sites, 10% are day use areas, 10% are winter staging areas and the remaining 9% are group camping areas.

Table 4-11 illustrates that only 11 of the 17 subregions are represented by Alberta's forest recreation areas—there are no sites in any of the three Grassland subregions, the Central and Foothills Parkland, and the Kazan Upland of the Canadian

Table 4-11
Distribution of Forest Recreation Areas* in Alberta, by Natural Region

Natural	Auto Access Camping	Group Camp	Day Use	Remote	Staging	Winter Staging	TOTAL* (No. of Locations)	TOTAL AREA (km^2)
				(No. sites)				
Parkland								
Peace R.	1	—	1	—	—	—	3 (3)	1
Foothills								
Main	60	13	13	3	33	18	140 (101)	61**
North. Outliers	3	2	2	—	1	1	9(7)	2**
Boreal Forest								
Subarctic	—	—	—	1	—	—	1 (1)	<1
Hay R.	4	—	4	—	—	—	8 (7)	2**
Peace R. Lowlds	1	—	1	4	—	—	5 (4)	2**
Mixedwood	13	4	2	13	14	4	50 (41)	8**
Rocky Mountain								
Montane	4	2	—	—	1	—	7 (6)	3**
Subalp/Alpine	3	—	1	1	4	—	9 (8)	8**
Canadian Shield								
Kazan Upland	—	—	—	—	—	—	—	
Athabasca Plain	—	—	—	3	—	—	3 (3)	<1
TOTALS	**89**	**21**	**24**	**25**	**53**	**23**	**235 (181)**	**89****

* indicates distinct sites (reservations)—there may be up to four separate sites at each location (e.g., auto access campground, group campground, day use area and staging area. Total number of named locations = 181

** data for some sites unavailable—estimate made by comparing size of other campgrounds of similar capacity

SOURCE: Alberta Forestry, Lands and Wildlife 1991a.

Shield. Almost 60% of all sites are found in the Main Foothills Natural Subregion, with 21% in the Mixedwood Boreal Forest, 4% in each of the Northern Outliers Foothills subregion and the Subalpine/Alpine Rocky Mountain subregion and smaller proportions of the other six subregions.

Most forest recreation areas (88%) are less than 1 km^2 in area and the total area represented is small, about 90 km^2. Table 4-11 presents the total areas on a subregion basis. The only site of significant size is the 15.5-km^2 Two Lakes Forest Recreation Area located 130 km southwest of Grande Prairie in the Main Foothills subregion.

There are more than 800 km of forest recreation trails designed and maintained for specific uses (cross-country skiing, snowmobiling, off-highway vehicle use) and thousands of backcountry hiking trails, many of which are not regularly maintained (Jones 1991: pers. comm.).

Protection and Management

These sites and trails have been developed and are managed for recreation use. The restrictions on use in these areas are intended to maintain the site in acceptable condition and provide for an enjoyable experience for all who use them. These are outlined in the regulations and include:

For forest recreation areas:

- protecting all natural objects or features
- leaving all natural objects or features in place
- limiting stay to 14 days
- obeying all speed and trail use regulations, including use of snowmobiles and horses,
- building fires in designated firepits
- using only firewood provided
- restricting disruptive activities
- keeping pets leashed

- refraining from washing near water supply and beaches
- not using firearms or dressing big game.

For forest recreation trails:

- not operating a motor vehicle on the trails
- using snow vehicles only on designated trails
- keeping animals leashed.

No fees are charged for using these areas, most of which are open for only part of the year. Forest guardians are hired from May to September to patrol the sites and backcountry areas to ensure that these areas are not overused and that the environment is protected.

Forest recreation areas are protected from industrial activity such as seismic lines, mining and logging.

Future Considerations

There are areas in Alberta where new campgrounds are needed (and planned) to meet the increasing demands from the public. The Alberta Forest Service has placed 294 protective notations (PNTs) on a total 2,120.82 km² and six consultative notations (CNTs) on a total 12 km² (Jones 1991: pers comm.). However, the Alberta Forest Service does not have the resources to develop these sites.

Negotiations are under way between Alberta Forestry, Lands and Wildlife and Alberta Tourism, Parks and Recreation regarding the transfer of auto-access campgrounds in the forest recreation areas to Alberta Tourism, Parks and Recreation.

Forest Management Agreement Areas

Early settlers of Alberta viewed Alberta's forests as a hindrance to agricultural development so proceeded to cut back the trees, especially the aspen of the Central Parkland and to a lesser extent, the northern mixedwood boreal forests. Even before the turn of the century, however, perpetual or sustained use of forested lands was seen as an objective—planting a tree for every one cut down. It was first introduced in a forest management plan for an Alberta coal mine in 1920 (Moen 1990).

With the signing of the Natural Resources Transfer Agreement in 1930, Alberta became owner responsible for its natural resources, including timber. But it wasn't until 1965, with funding from the federal government under The Forests Act, that the province began to take stock of its forest resources. There have been three forest inventories of Alberta's forests, with the most recent one completed in 1984, covering most publicly owned forested lands (excluding federal lands such as national parks, Indian reserves etc.) The inventory is annually updated at the Forest Management Unit level (see below) for fire and other major losses or changes.

The forest inventory differentiates among a wide variety of forest cover types (see Alberta Forestry, Lands and Wildlife 1985a, 1986a). The major factors are listed in Table 4-12.

In the 1950s, after significant development of the pulp and sawmill industry and increases in logging and reforestation, the Alberta Forest Service established a system of forest management units (FMU), each about 3,900 km² in size, organized by administrative area (Figure 4-4). There are 173 FMUs today.

Regulations for harvesting an annual allowable cut (AAC) in each FMU have been established. The AAC is calculated on the basis of the estimated total annual amount of wood grown in an FMU minus the estimated losses due to insects, forest fires, disease and decay. Theoretically, in each FMU, the timber harvest does not exceed the estimated volume of wood that grows over that area in one year, thus sustaining the volume of timber in the area. This approach has been likened to maintaining the level of water in a bathtub with the drain open and the faucet on.

The Timber Management Regulation of The Forests Act of 1961 sets out other requirements for timber harvesting, including: harvesting older trees before younger ones, clearcutting timber of the same age in a block, leaving blocks or strips to ensure natural seeding of cut areas, scarifying cutover areas for reforestation (breaking up debris left after logging and preparing the area so that new trees can grow) and submitting annual operating plans detailing how, when and where harvesting will occur.

The Alberta Forest Service is responsible for regulating and managing all activities on the provincially owned forest lands (Green Area). As owner and "developer" of Alberta's forests, the AFS, on behalf of the government, wants to ensure the most efficient use of the timber resource and realise the best economic return from those uses. But as regulator it must also take into account other public interests relating to these areas, such as protection and conservation of their water, fish and wildlife, outdoor recreation and

Table 4-12
Forest Cover Types

Productive*	**Potentially Productive**	**Nonproductive**	
		Forested	Nonforested
Species	Brush	Coniferous scrub	Grassland
Density	Burnt	Deciduous scrub	Cutbank
Height	Clearcut	Treed muskeg	Open muskeg & bog
Commercialism (commercial use, such as lumber)	Insect killed		Sand, silt & clay
Age	Disease killed		Rock & barren
Site category (level of productivity)	Various killed		Soil & barren
	Windfall		Flooded land
			Water
			Cleared land
			Cultivated land
			Unclassified land

* on forest classification maps this usually translates into general categories such as: coniferous stands over and under 18 m, mixedwood stands over and under 18 m, deciduous stands over and under 18 m.

ADAPTED FROM: Alberta Forestry, Lands and Wildlife 1985: 5 (see also Alberta Forestry, Lands and Wildlife 1986a).

wilderness resources and the unique ecosystems they represent.

The Forests Act sets out the ways by which Alberta may manage the timber resource. It does not allow the Minister to sell forest land outright but rather to license individuals or companies to remove Crown timber in one of four ways: (1) timber permits, (2) quotas, (3) licences and (4) forest management agreements (FMAs). Timber permits and quotas are mechanisms that enable individuals and companies to harvest timber without the long-term responsibility of managing the forests on which the harvesting is done. (The Alberta Forest Service retains that responsibility.) Forest management agreements, on the other hand, provide companies with the right to harvest, establish and grow trees on a specific tract of forest land on an ongoing basis over 20-year periods. The FMA is normally renewable subject to performance, renegotiation and approval. These mechanisms facilitate a spectrum of forestry operations from small, short-term harvesters to large-scale, long-term forest management.

Timber permits allow timber harvesting on the smallest scale and over the shortest period—usually up to a maximum of three years, except for large permits, which may be for longer. Each permit specifies who is to harvest the timber, the specific location, the kind of timber to be harvested, and terms and conditions of the permit. There are several kinds of permits, including commercial timber, local timber (usually for individuals' use and sale, e.g., firewood), forest product tags (for personal use) and Christmas tree. Most permit holders are not required to produce operating plans because the amounts are small and the terms short. The Forests Act provides that a timber permit holder (except for a Christmas tree) pay a reforestation levy. Only commercial timber permit holders have the option of reforestation. Permit holders pay Crown dues for the permits, as outlined in the regulations.

The Timber Management Regulation provides for the sale of timber quotas, the right to a specified percentage of the Annual Allowable Cut for an FMU, which can be up to 100%. Quotas issued in 1966 and still in existence in 1986 were renewed for a further 20 years, to 2006. Now almost all quota certificates issued by the Alberta Forest Service will expire in 2006. This will provide AFS with the opportunity to alter quotas or cancel them. (To address more immediate concerns, the Minister may change any provision of a quota licence or permit after 30 days if in the opinion of the Minister, it is in the public interest to do so.)

New timber quotas are sold by auction, with the buyer of the quota paying holding and forest protection charges, a performance guarantee deposit and dues for the timber harvested. Quotas are issued to all sizes of forestry companies, from family-owned

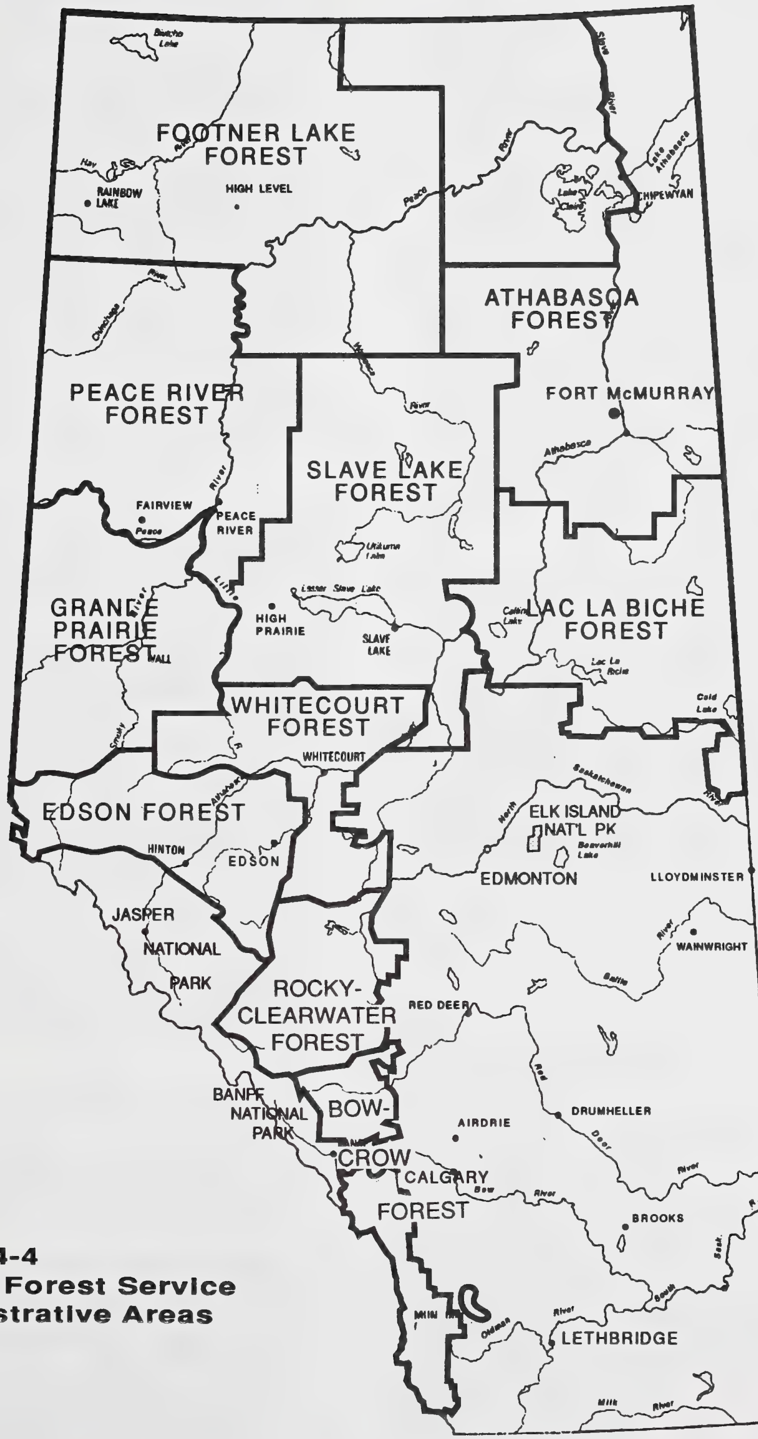


Figure 4-4
Alberta Forest Service
Administrative Areas

operations to large multinationals. For example, a pulp company may hold quotas in FMUs surrounding a forest management agreement area to augment the timber supply from the FMA area. Sawmill operators with coniferous quotas may be directed to sell residual chips to specified pulp mill operators to ensure that the timber resource is not wasted.

A quota holder cannot harvest trees until he is issued a licence, which indicates exactly where he can harvest. The holder must prepare, for the Minister's approval, a general operating plan for each wood processing facility using quotas, which gives other forest users, such as trappers, an indication of where and when harvesting will be done. In addition, he must also prepare annual operating plans (AOP) for each year of operation, which detail exactly where the harvesting will be done and how much of the approved volumes will be harvested each year. Quota holders are expected to harvest the timber according to these plans, taking within 10% of the volume authorized, or face penalties.

Every quota certificate and licence holder and commercial timber permit holder is required to operate according to the Alberta Timber Harvesting Planning and Operating Ground Rules, imposed under Section 18(1) of The Forests Act, which gives the Minister the power to prescribe terms and conditions. These rules cover a wide range of topics including cutblock layout, block size, reforestation, forest protection, landscape management, road planning and construction, watershed protection, wildlife habitat, erosion control and storage of fuel and chemicals (Moen 1990).

Purpose of Forest Management Agreements

A forest management agreement (FMA) is a contract between the province of Alberta, represented by the Minister of Forestry, Lands and Wildlife and a forestry company. The FMA grants the company the timber management rights to a specific tract of forest land; to harvest, establish and grow trees on a "perpetual, sustained yield basis" for a defined period, usually 20 years (renewable). It is negotiated in private between the Minister and the company and approved by the Lieutenant Governor in Council (the cabinet). The first agreement was signed in 1954.

An FMA is the means by which the Alberta government encourages development of integrated wood processing facilities, such as fibreboard or pulp mills, not sawmills alone. This is in keeping with the government's policy to diversify the province's economic activity; beyond providing only raw natural resources. An FMA provides the company with a secure Crown land base and supply of wood so that it can recover its investment.

The forest management agreement gives the company exclusive access to the timber resource of the area (it may be for either coniferous or deciduous trees, or both) and transfers the day-to-day responsibility of forest management from the Alberta Forest Service to the company. In return, the company pays a deposit, annual holding and protection charges for every square kilometre in the FMA, and timber dues on timber cut from the area. In addition, the company must comply with a number of planning, operating and reporting requirements and responsibilities outlined in the agreement, regulations and ground rules (see this section).

Legislation and Government Administration

As noted earlier, The Forests Act of 1971 provides the authority for the Minister of Forestry, Lands and Wildlife to allocate the timber resource of Alberta. It also gives the provincial cabinet (Lieutenant Governor in Council) and the Minister power to make regulations. To date there are three sets of regulations under the Forests Act: The Forest Land Use and Management Regulations, the Timber Management Regulation and the Forest Land Use Zone, Forest Recreation Area and Forest Recreation Trail Regulations.

Cabinet has been given the authority to enact regulations pertaining to:

- Terms and conditions for timber dispositions (forest management agreements, timber quotas and permits) including initiation, transfer, use, amendments, suspension, cancellation or reinstatement.
- Establishing Crown charges and the timing, method of payment and enforcement of payment.
- Prescribing charges for damages done to timber stands by roads, lines, right-of-ways or other disturbances.
- Establishing fees for timber dispositions or quotas *per se*.
- Governing all aspects of reforestation and afforestation on public land.
- Designating the primary timber products and regulating all primary timber processing and primary timber processing plants.

- Regulating the transport of timber and timber products.
- Governing record keeping relating to timber production and sales and purchases of timber and timber products.
- Governing the management and use of forest land.
- Prescribing the penalties for contravening the Forests Act or the regulations.
- Respecting any other matter necessary or advisable to carry out effectively the intent and purposes of the Forests Act (Moen 1990).

Section 6 of The Forests Act provides for the Minister of Forestry, Lands and Wildlife to administer "all public land that is contained in or subject to timber dispositions, forest land use zones, forest recreation areas or forest recreation trails" and in Section 7 it states:

> *The Minister shall administer and manage timber on public land under his administration and standing and cut timber on all road allowances.*

The regulations the Minister may make under The Forests Act are generally administrative in nature and include:

- Governing logging methods and wood utilization standards.
- Specifying standard terminology and other specifications for the preparation of documents required by the Act or the regulations.
- Prescribing forms, notes, records and accounts.
- Prescribing rates to be charged for the use of department employees, equipment and facilities.
- Governing all matters pertaining to scaling and scaler.
- Establishing training programs and facilities. (Moen 1990).

Section 16 of The Forests Act provides the authority for entering into a forest management agreement:

> *16(1) The Minister, with the approval of the Lieutenant Governor in Council, may enter into a forest management agreement with any person to enable that person to enter on forest land for the purpose of establishing, growing and harvesting timber in a manner designed to provide a perpetual sustained yield.*

Forest management areas are delineated by senior government officials in consultation with the forestry company. There is no public participation in the process of delineating FMA boundaries. However, several areas may be excluded from the FMA, including:

1. Any areas that have an existing land disposition or pending or reserved disposition. This includes lands that are reserved and protected by other government agencies for ecological reserves, provincial parks and recreation areas, natural areas, wilderness areas and wilderness parks and other uses under the Forests Act (forest land use zones, recreation areas and trails) and the Public Lands Act (grazing). Lands reforested by the department under the Maintaining Our Forests program are also excluded.
2. Large contiguous tracts of "unproductive" land (without merchantable timber), such as muskeg.
3. Beds and shores of all permanent and naturally occurring bodies of water, and all naturally occurring rivers, streams, watercourses and lakes.

FMAs are usually in effect for 20 years and holders are entitled to renew for another 20 years as long as they are not in default on the expiry date of any "terms, conditions, stipulations, covenants and provisions of the agreement" (Section 2(3) of most agreements). If a renewal agreement cannot be reached, the FMA is extended for another five years to allow for another agreement to be signed.

The Forests Act gives the FMA holder ownership of the growing trees and protection from any third party (not the Crown) who damages the timber or improvements made by the company. The right given an FMA holder is for the management of timber in the forest management area, including the "right to enter upon and occupy the forest management area, to grow, cut and remove timber, to reforest, and to construct roads, camps and other installations necessary for a company's operations" (Moen 1990: 15). (These would include processing plants and waste treatment, transportation and silviculture facilities.)

Section 8 of each forest management agreement states that although the primary use of the FMA is for growing and harvesting timber, and that right is protected by the agreement; in keeping with the government's multiple use policy, the Minister reserves all land rights not specifically given in the agreement. The wording is:

8(1) It is recognized by the Minister that the company's use of the forest management area for growing and harvesting timber is to be the primary use thereof and that it is to be protected therein, but in keeping with the policy of providing for multiple uses of the same public land, the Minister reserves all land rights on the forest management area not specifically given hereby.... (up to 1991)(see Alberta Gazette 1985; Alberta Order in Council 1977, 1986, 1988a, 1988b, 1989a, 1989b, 1990).

In three of the nine existing agreements the phrase "and recognizing that certain portions of the forest management area have been designated for uses by integrated resource plans" has been added after "same public land."

Section 8(1) continues with a listing of some examples of land rights the Minister reserves, including:

- Travel, fishing, hunting and recreational activities; subject to restrictions necessary to prevent accidents, control fire or protect roads.
- Conducting geophysical or geological explorations; with the forest company entitled to reasonable compensation for loss of or damage suffered as a result of these actions.
- Harvesting timber under permits of not more than a year for local use by municipalities and residents.
- Maintaining and enhancing fish and wildlife resources.
- Authorizing trapping and domestic stock grazing providing that regeneration growth of trees is not damaged to the extent that reforestation standards are not met and that the company's right to manage the area for timber production is not significantly impaired.

Section 6(1) of the FMA provides the Minister with some flexibility to withdraw areas from the FMA, although there is still some confusion as to the extent of his right (Moen 1990):

6(1) The Minister may, at any time in his discretion, after consultation with the company, either permanently or for a specified term, withdraw from the forest management area:

(a) any land which cannot be logged without causing substantial harm to the water table or to lakes, rivers, streams or other bodies of water, to the margins of watercourses or to roads (no compensation is made in these cases); and

(b) any lands required for rights-of-way, water resource development or **for any other purposes** (author's emphasis) deemed by the Minister to be required for the human or physical resources development of the province.

In some agreements other uses and withdrawals are stated, such as:

(c) any lands required for commercial and industrial facilities; and

(d) any lands that are not capable of producing merchantable coniferous or deciduous timber.

There are several ways compensation can be made to the company when the Minister withdraws land from the FMA. Section 6(3) of the Slave Lake Pulp Forest Management Agreement of November 1990 (Alberta Order-in-Council 1990) outlines the three conditions of compensation for withdrawals:

(a) **for disposition to users other than the Crown** except where that use has been designated for exemption by the Minister the company shall be entitled to reasonable compensation from the users for any loss of profit or other damage or loss suffered by the company, including by way of example, but without limitation, damage to deciduous timber, regeneration, forest growth, improvements, or to its operations on the forest management area resulting from such withdrawal and the company shall determine such compensation for damage to deciduous timber, deciduous regeneration and deciduous forest growth in accordance with the department's stand damage appraisal table and associated guidelines as amended or replaced from time to time.

(b) **for use by the Crown,** and for uses designated for exemption by the Minister, wherein the net aggregate area withdrawn on a cumulative basis **does not exceed 3%** (in other FMAs this was either 1 or 2%) of the net forest management area, the Minister shall determine the compensation and arrange for reimbursement to the company for loss or damage resulting from such withdrawal to any improvements created by the company's efforts, but not for any loss of profit, inconvenience nor increased costs reasonably incurred by the company in harvesting an equivalent volume of timber elsewhere.

(c) **for use by the Crown,** and for uses designated for exemption by the Minister, wherein the net aggregate area withdrawn on a cumulative

> basis **does exceed 3%** of the net forest management area, the Minister shall determine the compensation in respect of such excess and arrange for reimbursement to the company for any increased costs reasonably incurred by the company in replacing the lost volume of deciduous timber and for any loss or damage suffered by the company, including damage to deciduous timber, regeneration, forest growth, improvements, or to its operations on the forest management area.

In the first instance, compensation is paid by the nongovernment user who will use those lands that are being withdrawn. In the second, the compensation is limited to loss or damage resulting to the improvements that the company has made. However, when the cumulative withdrawal exceeds the stipulated percentage, the Minister then must pay considerably more compensation in the form of costs to replace the lost volume and losses to the company's operation on the FMA. To date, withdrawals have been small and never approached the proportion stipulated in the FMA.

In early FMAs there was a clause that stated that the Minister could add available public land to the FMA as full or partial compensation for lands withdrawn. In recent agreements, this has not been included. There is a requirement of the Minister to return excluded lands, if no longer to be excluded, in a productive or potentially productive state.

Section 10 of most FMAs outlines the requirements for joint development of specific Timber Harvesting Planning and Operating Ground Rules within six months of the commencement of the agreement, and submission to the Minister for approval of a preliminary forest management plan within 12 months and before woods operations begin (see Alberta Forestry, Lands and Wildlife 1987a for a general description).

The ground rules outline the standard planning, timber harvesting, general operations (construction of roads, operation of camps and facilities etc.) and reforestation and restoration requirements of the company.

> *It is recognized that there will be circumstances to which these standards should not be rigidly applied (Alberta Forestry, Lands and Wildlife 1990b: 1).*

These rules must be reviewed at least every five years and altered by mutual agreement of the Minister and the company. If agreement is not reached, the Minister may establish or revise the ground rules but only with the approval of the Lieutenant Governor in Council.

The preliminary forest management plan describes how the company will manage the timber resource in the FMA on a sustained yield basis and includes the estimate of the annual allowable cut in the area and the long-term harvest sequence.

Not more than three years after the agreement commences, the company must submit for the Minister's approval, a detailed forest management plan for managing the timber of the area for the equivalent of one rotation (the planned replacement period in which trees have grown to maturity on harvested areas and can then be harvested). The rotation period ranges from 60 to 80 years for deciduous trees and 100 to 120 years for coniferous trees. This plan replaces the preliminary plan. A revised detailed forest management plan must be submitted for the Minister's approval not later than the tenth anniversary date of the agreement.

The company is charged with considering the interests and concerns of the general public and other resource users in a manner consistent with the terms and conditions of the forest management agreement.

> *Public involvement is mandatory for all forest management plans regardless of what stage they are at in terms of review and approval (Alberta Forestry, Lands and Wildlife 1990e: 1).*

Alberta Forestry, Lands and Wildlife is responsible for defining the framework for the process, helping the company initiate a public involvement process, monitoring the process to ensure that public concerns are defined and addressed, and communicating to the public provincial forest management strategies. This also includes resolving conflicts when industry and public concerns differ, and addressing concerns that cannot be dealt with as part of FMA planning (Alberta Forestry, Lands and Wildlife 1990d, 1990e).

As part of the public involvement process, Alberta Forestry, Lands and Wildlife will generally require that Forestry Environmental Liaison committees be established to advise (only) on environmental aspects of the forest management and wood processing activities in the FMA. These committees include representatives from the local area around the FMA and include various interest categories, not just interest groups (Alberta Forestry, Lands and Wildlife 1990d, 1990e). The committee can advise on forest management issues only, not, for example, pulp mill operations.

Within four months of the signing of a forest

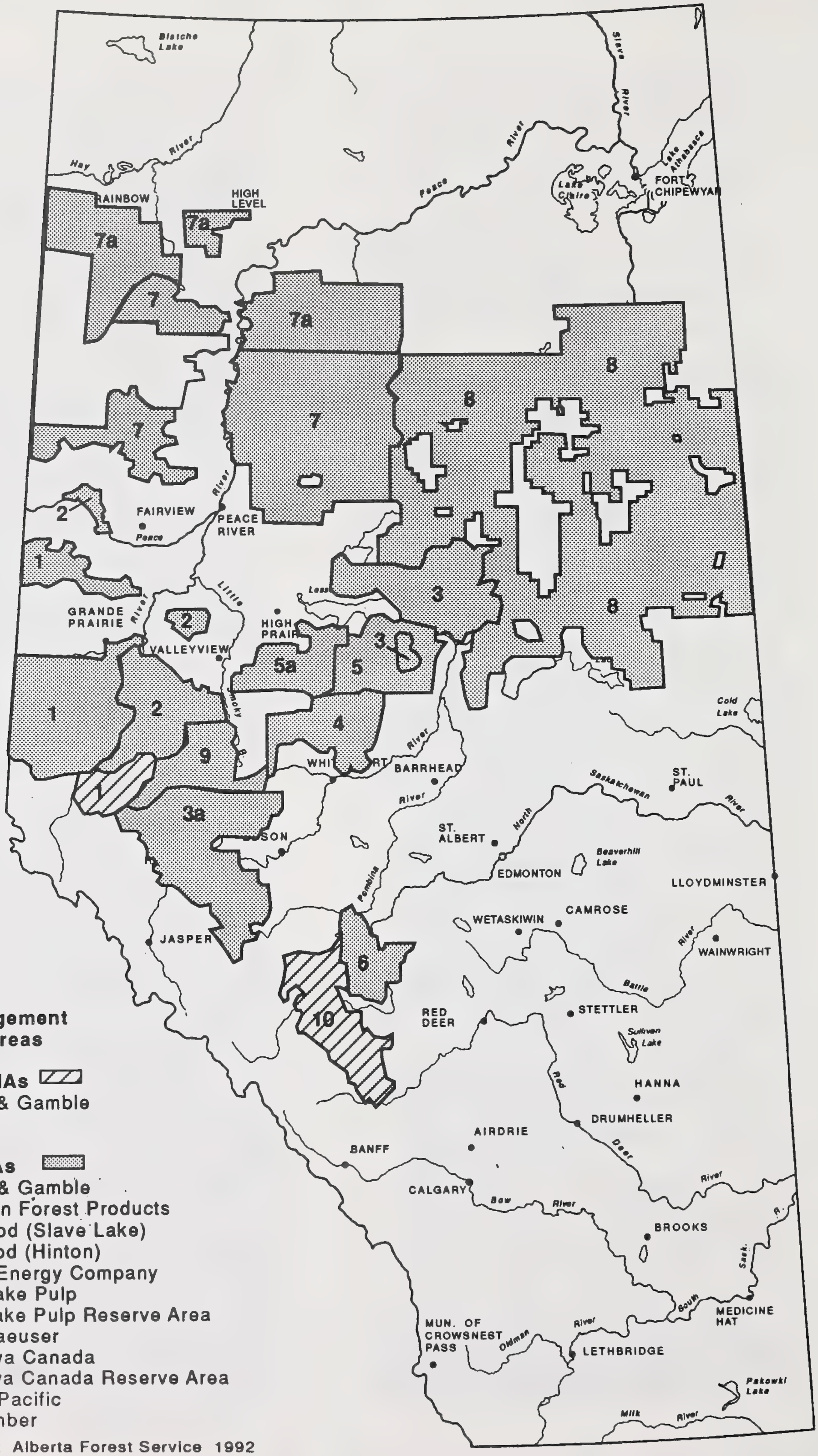


Figure 4-5
Forest Management Agreement Areas

Proposed FMAs ▨

1	Procter & Gamble
10	Sunpine

Existing FMAs ▒

1	Procter & Gamble
2	Canadian Forest Products
3	Weldwood (Slave Lake)
3a	Weldwood (Hinton)
4	Alberta Energy Company
5	Slave Lake Pulp
5a	Slave Lake Pulp Reserve Area
6	Weyerhaeuser
7	Daishowa Canada
7a	Daishowa Canada Reserve Area
8	Alberta Pacific
9	ANC Timber

SOURCE: Alberta Forest Service 1992

Table 4-13
Forest Management Agreement Areas in Alberta (1992), by Natural Region

Natural Region	**FOREST MANAGEMENT UNIT(S) (see Figure 4-5)**	**EXISTING AREA(a) (km^2)**	**FUTURE AREA(a) (km^2)**
PARKLAND	REGION TOTAL	**540**	**0**
Peace River			
Procter & Gamble	G1	540	
Subregion Total		**540**	
FOOTHILLS	REGION TOTAL	**40,230**	**11,040**
Main			
Alberta Energy	W4	280	
ANC Timber	W1,3; E6,7	2,990	
Canadian Forest Products	E5C,2C; G5C	3,930	
Daishowa	P2,10	4,650*	
Procter & Gamble	E8; G3,4,6,7	9,820*	1,800
SunPine	R2,5,7,8,9; B6,8		5,590
Weldwood-Hinton (3,700 deciduous, 5100 coniferous)	E1N,3N,4N,6,6N,7,7N11	9,530	
Weyerhauser	R1,2,4	2,020	
Subregion Total		**33,220**	**7,390**
Northern Outliers			
Alberta Energy	W3,4	2,200	
Alberta-Pacific	L2,S4	430	0
Daishowa	F1,2		310**R**
Slave Lake Pulp	S1,2,8	2,610*	3,340***R**
Weldwood-Slave Lake	S3,5	1,770	
Subregion Total		**7,010**	**3,650**
BOREAL FOREST	REGION TOTAL	**93,900**	**15,740**
Subarctic			
Alberta-Pacific	A8; S13,14	600*	0
Subregion Total		**600**	**0**
Hay River.			
Daishowa	F13,14		5,530***R**
Subregion Total		**0**	**5,530**
Peace River Lowlands			
Alberta-Pacific	A7	220*	0
Subregion Total		**220**	**0**
Mixedwood			
Alberta Energy	W4	1,660	
Alberta-Pacific	A1,2,3,4,5,7,8; L12,3,,4, L5,8,9; S4,8,11,12,13,14	61,000*	0
ANC Timber	W1	90	
Canadian Forest Products	G5,5C,2C	2,510	
Daishowa	F1,2,11; P2,3,4,9,10,11; S10,15	20,290*	10,020***R**
Procter & Gamble	G1	1,000*	
Slave Lake Pulp	S1,8	1,510*	190***R**
Weldwood-Slave Lake	S3,5,6	4,830	
Weyerhauser	R1	190	
Subregion Total		**93,080**	**10,210**
ROCKY MOUNTAIN	REGION TOTAL	**330**	**400**
Subalpine/Alpine			
Weldwood Hinton	E4N,6N,7N,11	330	
Procter & Gamble	E8; G3,6		400(c)
Subregion Total		**330**	**400**
CANADIAN SHIELD	REGION TOTAL	**440**	**0**
Athabasca Plain			
Alberta-Pacific	A10	440*	0
Subregion Total		**440**	**0**
TOTAL AREA*		**135,440**	**27,180**
		COMBINED TOTAL	**167,620(b)**

*based on forest inventory results

(a) Based on information provided by Timber Management Branch, Alberta Forest Service (Schultz 1992: pers. comm.), and rough allocation to natural subregion

(b) This does not include the areas affected by quotas and licences to harvest the forests. All forest management units have quota holders except a few in the Footner Forest of northwestern Alberta.

(c) Rough estimate by author, based on FMA map.

NOTE: The Alberta-Pacific Forest Industries Forest Management Agreement was signed in August 1991 – only a rough estimate of the FMA area is available.

R - Reserve Area

management agreement, the company must submit a public involvement plan for approval by the Minister (Alberta Forestry, Lands and Wildlife 1990e). The plan will present what methods will be used to involve the public, a schedule of events, which public groups should be involved, how the information will be provided to the public and how public input will be recorded.

The company is responsible for public information and consultation specific to the FMA and must involve the forestry liaison committee and hold at least one event for the general public to:

- inform the public about how they can have input into the FMA plan,
- inform the public about harvesting and reforestation on the FMA while the plan is being developed, and
- record the public's concerns about harvesting activity, other important uses in the FMA area and any other issues relating to the FMA.

The company must submit all formal input received (written submissions and verbal presentations at public meetings) to Forestry, Lands and Wildlife. The company is required to review and evaluate each issue and concern and determine how it can be addressed in the forest management plan or further resolved or referred to government where the issue is not within the mandate of the company. Further public consultation is recommended only to resolve specific issues so the planning process does not become stalled. An issue summary report, showing how each issue identified by the public is addressed or not addressed in the detailed forest management plan is submitted along with the preliminary forest management plan for review by the department. It is then presented by the company in a public forum and also to the liaison committee.

Local public input will continue to be received by the liaison committee throughout the life of the agreement—the company is required to prepare an annual statement on how concerns raised by the liaison committee were dealt with. In addition, public meetings are also held at the time of plan review, and every five years.

Currently, there is not general public input into the formulation of the ground rules for each FMA.

Distribution and Natural Region Representation

Most FMUs have local timber permits and tree tags and permits. In 1989/90 there were 1,146 local timber permits and 29,725 Christmas tree permits and tree tags issued (Alberta Forestry, Lands and Wildlife 1991b: 9). The location of commercial timber permits varies from year to year depending on the extent of larger harvesting operations and the age and condition of the timber in the FMUs. In 1989/90, 74 coniferous commercial timber permits were issued (including three for dead or damaged timber). Eight deciduous permits were issued. All timber dispositions are monitored on an ongoing basis.

In 1989/90 there were seven coniferous timber quotas issued and no deciduous timber allocations (quotas). Forest Management Unit dispositions are monitored on a periodic basis from the time of the annual operating plan approval until disposition cancellation. The number of inspections is generally dictated by the size of the disposition, except when concerns have arisen.

Figure 4-5 and Table 4-13 outline the location and size of forest management agreement areas, either in existence or being planned in 1992. Most of the 157,570 km² covered by existing FMAs is found in the Main Foothills subregion (39,070 km² - 25%) and the Mixedwood Boreal Forest (109,330 km² - 69%). Small areas in the Peace River Parkland (540 km²), Northern Outliers Foothills (7,210 km²) and Subalpine/Alpine Rocky Mountain subregions (440 km²) are also included in existing FMAs.

Protection and Management

The mechanisms for managing Alberta's timber resources, outlined in the previous sections, enable people and companies to remove mature deciduous and coniferous trees to be converted into products. This process involves significant direct and indirect alteration of the ecosystems of which the trees are but one component.

Land considered nonproductive for timber will not be harvested, but may be directly affected by roads or other infrastructure elements (e.g., camps, runoff from harvested areas). The degree of disturbance of these lands will depend on the distribution of harvestable forest—whether it is in large contiguous blocks or smaller ones. In the latter case, more roads will be required to join harvest areas and there will therefore be greater disturbance of the nonproductive areas (Wrangler 1991: pers. comm.).

Table 4-14 provides rough estimates of the minimum area that could be left undisturbed – these figures represent nonproductive areas only. Subtract from these estimates the nonproductive areas affected by roads. Add all those areas already legally protected or proposed for protection by other agencies.

Table 4-14
Estimated Area of FMA Areas Excluded from Harvesting, by Natural Region*

Natural Region	EXISTING AREA (km²)	% NP*	EXCLUDED from Timber Harvesting	FUTURE AREA (km²)	% NP*	EXCLUDED from Timber Harvesting
PARKLAND						
Peace River						
Procter & Gamble	540	23	120			
Subregion Total	**540**		**120**	**0**		
FOOTHILLS						
Main						
Alberta Energy	280	12	30	0		
ANC Timber	2,990	18	540			
CanFor	3,930	10	390			
Daishowa	4,650	36	1,670			
Procter & Gamble	9,820	23	2,260	1,800	23	410
SunPine (excludes Zone 1 & 2 Eastern Slopes areas)				5,590	13	730
Weldwood-Hinton	9,530	13	1,240			
Weyerhauser	2,020	23	460			
Subregion Total	**33,220**		**6,590**	**7,390**		**1,140**
Northern Outliers						
Alberta Energy	2,200	12	260			
Alberta-Pacific	430	47	200			
Daishowa Reserve Area				310	36	110
Slave Lake Pulp	2,610	15	390	3,340	7	230
Weldwood-Slave L	1,770	33	580			
Subregion Total	**7,010**		**1,430**	**3,650**		**340**
BOREAL FOREST						
Subarctic						
Alberta-Pacific	600	47	280			
Subregion Total	**600**		**280**	**0**		**0**
Hay River.						
Daishowa Reserve Area				**5,530R**	29	**1,600R**
Subregion Total	**0**			**5,530**		**1,600**
Peace River Lowlands						
Alberta-Pacific	220	47	100			
Subregion Total	**220**		**100**	**0**		**0**
Mixedwood						
Alberta Energy	1,660	12	200			
Alberta-Pacific	61,000	47	28,670			
ANC Timber	90	18	20			
CanFor	2,510	10	250			
Daishowa	20,290	36	7,300	10,020	29	2,910
Procter & Gamble	1,000	23	230			
Slave Lake Pulp	1,510	15	230	190	7	10
Weldwood - Slave L	4,830	33	1,590			
Weyerhauser	190	23	40			
Subregion Total	**93,080**		**38,530**	**10,210**		**2,920**
ROCKY MOUNTAIN						
Subalpine/Alpine						
Weldwood-Hinton	330	13	40			
Procter & Gamble				400	23	90
Subregion Total	**330**		**40**	**400**		**90**
CANADIAN SHIELD						
Athabasca Plain						
Alberta-Pacific	440	47	210			
Subregion Total	**440**		**210**	**0**		**0**
TOTAL AREA	**135,440**	**35**	**47,300**	**27,180**	**22**	**6,090**

* includes nonproductive (for timber) lands only (see text for details)
Based on information obtained from Forest Statistics Branch of Alberta Forest Service.

NOTE: The Alberta-Pacific Forest Industries Forest Management Agreement was signed in August 1991 – only a rough estimate of the FMA area is available.

Add also lands that are productive for timber but do not have "merchantable stands," or are too small or isolated to warrant harvesting. Add also lands that are left as stream and lake buffers, wildlife cover areas and corridors. Add road buffers, if they are required. When all of these factors are added up, the unharvested portion can reach as high as 50 to 70% of the FMA (Moen 1990). The Alberta Forest Service is currently trying to assess how much land is acturally directly affected by forestry operations in different part of the province.

There are several pitfalls in assessing protection provided in FMA areas by this subtraction and addition method. First of all, except for those areas already identified by other agencies and discussed in this chapter, no additional protection mechanisms are employed by the Alberta Forest Service to set aside large areas supporting forest ecosystems. Pachal (1992) points out that the Alberta Forest Service has no written policy that recognizes wilderness as a resource and sets out guidelines for its preservation in forest management agreement areas. She also notes that in the Bow Crow Forest, all lands with merchantable timber have been allocated for timber harvesting (Pachal 1992).

In 1990 the department did commission a study of the significant natural features in the eastern boreal forest region, most of which is included in the Alberta-Pacific Forest Management Agreement area (D.A. Westworth and Associates 1990). The report was released to the public in the fall of 1991, after the FMA was signed.

Although under Section 46 there is the provision for cabinet to prohibit uses of forestlands, little of Alberta's forests has been set aside for benchmark, research, special preservation or simply "let's leave some of this for future options" reasons. The only parts of Alberta's forestland that are permanently protected are the more than 600 permanent sample plots, which are registered in the department's Land Status Automated System (LSAS) computer registry system. Unfortunately, although these are found in every FMU, in immature, mature and overmature stands, they are only 200 to 2,000 m^2 in size. They are remeasured every five to 10 years and are used to track forest growth over time. The AFS has also established 250 plots in cutover and burnt over areas. They were established in 1985-86 and are remeasured on a two-to-5-year cycle. Each plot is 100m^2 in size and is also under protective designation in LSAS (Alberta Forestry, Lands and Wildlife n.d.).

AFS has not provided permanent protection for tracts of forestland in the same way it has for its sample plots. This means that although there are large tracts of "unproductive" (for merchantable timber) land, often large and contiguous in the north, they may not be assured the continuity with forested areas that are part of these complex ecosystems.

It is evident from Table 4-14 that there is great variation in the ecosystems from which timber is taken in Alberta. The highest rate of return (85% or greater) occurs in coniferous forests in the Foothills, where thousands of square kilometres of relatively uninterrupted forest are found. The lowest rate of return is for the Alberta-Pacific FMA (53%), an area often interrupted by muskeg. This is also the case with much of the Daishowa and Weldwood-Slave Lake FMAs.

Areas to be excluded are defined in the annual operating plan and the level of exclusion, whether permanent or temporary, is defined in the operating authority. Operations monitoring ensures that these deletions are maintained and should they be altered through any phase of the operation, penalties may be imposed under the authority of the Timber Management Regulation.

Areas already designated by law as restricted or protected sites are usually excluded from FMA areas, or at least from harvesting activities. Those identified by reservation or notation by provincial agencies, for existing or potential dispositions such as grazing, wildlife management, ecological reserves, bird sanctuaries, natural areas, provincial parks and recreation areas, forest recreation areas and trails etc. are considered and often excluded from designated forest harvesting areas (permit, quota and FMA areas).

However, if these agencies have not registered their interest or concerns about specific areas in a proposed FMA before the FMA is signed, there is little opportunity to close access to them, unless the province exercises its option to withdraw lands for public purposes. This option has been rarely used and never up to the limit of 1 to 3% of total FMA area.

All FMA holders are required to complete public participation programs. Timing of the plans has affected who has completed what steps in the required process. Weldwood, Daishowa, Alberta Energy and Slave Lake Pulp have conducted activities and several others are preparing to do so.

There is no doubt that "protection of the environment" during forestry operations is required by the Alberta Forest Service, which oversees the broad range and size of forestry operations in Alberta. Most of Alberta's forestland harvested under various types of permits, quotas, licences and forest management agreements are subject to the Timber Harvest Planning and Operating Ground Rules (Alberta Forestry, Lands and Wildlife 1987a), which provide operational guidelines designed to minimize the direct effect of harvesting operations on such elements as watercourses, wildlife, steep and highly erodable terrain, aesthetics and other human uses, including some recreational uses and trapping. For example, companies are advised to refer to the AFS publication *Forest Landscape Management Strategies for Alberta* (Alberta Forestry, Lands and Wildlife 1986c) to design harvest layout that will minimize visual impact in visually sensitive areas.

One obligation included as part of the Operating Ground Rules is that the oldest wood be cut first (old growth be removed as soon as possible). While steep slopes and stream edges may be protected under the ground rules, this does not ensure old growth protection in the full range of ecological sites.

AFS requires detailed block plans for sensitive or complex sites, including critical wildlife and fisheries areas. Cutblock size has over the years been diminished to a maximum of 60 ha for deciduous and 32 ha for spruce, for example, and is now designed with silviculture and wildlife needs in mind. The average coniferous cut unit is now about 18 ha.

For some areas, detailed wildlife objectives have been included in the operating ground rules, such as for the Daishowa FMA where wildlife management zones for caribou, moose, trumpeter swans and other sensitive species have been delineated. For caribou, for example, one-third of their winter range must be maintained in mature or overmature coniferous forest in blocks as large and continuous as possible, and travel corridors between areas must also be left. Within cutblocks, small patches of unmerchantable timber should be maintained to provide screening and hiding cover. Scheduling limits are also placed on the company to minimize disturbance to the caribou. Requirements for trumpeter swans, moose, special habitats (e.g., mineral licks, denning or nesting sites) and snags (dead standing trees) have also been included in the Daishowa ground rules (Alberta Forestry, Lands and Wildlife 1990b; see also Alberta Forestry, Lands and Wildlife 1987d). For example, half-kilometre wide buffers with restricted activity have been designated around trumpeter swan nesting areas.

The planning and harvesting ground rules are designed to ensure that the land is able to sustain production (in this case wood) and not significantly affect uses beyond the boundary of the area (such as water uses). They are based on the concept of multiple use, that an area should and can sustain a variety of uses, without significant effect on each other. In other words, they allow for some form of "mutual existence" among users of the area, including timber harvesters, wildlife and the general public.

There is no doubt that the total effect of developing Alberta's existing and future FMAs will be a dramatic transformation of thousands of square kilometres of naturally evolving, indigenous forests. Forest management agreement areas in particular have been designed to provide forestry companies with long-term access and control of Alberta's native deciduous and coniferous forests, to cut them down and replace them with areas managed for optimum tree production. These contracts require ongoing and complete utilization of the timber resource.

The operating ground rules for timber harvesting are being revised to reflect new environmental concerns, especially for wildlife. But the effects of these initiatives will not be seen for years, and some may not be beneficial in maintaining a complex and healthy ecosystem. For example, the trends to smaller cutblock design, and two or three pass harvesting will mean that although habitats won't be so drastically eliminated, harvesting operations will be more pervasive and road systems more extensive and permanent.

Future Considerations

Figure 4-5 and Table 4-13 indicate the areas that are under negotiation for most of the unallocated Green Area forestland. Most will likely be designated under FMAs within the next five years. This will increase the total area under FMA by more than 20%, from 135,440 to 167,620 km². The increase will take place mostly in the Foothills and Boreal Forest natural regions. An FMA soon to be signed is Sunpine FMA, covering almost 7,000 km² of coniferous forest in the Main Foothills subregion near Rocky Mountain House. This will be Alberta's most southern FMA area.

The department has undertaken an Environmentally Sensitive Site study for the proposed Sunpine FMA, which may provide the basis to delineate, exclude and protect areas of local, regional or provincial significance that have not been identified or studied by provincial government agencies.

Developments on public lands where an approved integrated resource plan (IRP) has been approved must follow the resource decisions and direction outlined in the plan. However, only a small portion of the total area covered by forest management agreements has been covered by IRPs. In the future, when IRPs are completed and approved for those areas where the FMA plan exists, these plans will be reviewed and revised as necessary to reflect the IRP. IRPs are also based on a combination of multiple use and integrated use concepts, however, which may not always contribute to maintaining the ecological integrity of an area (Swinnerton 1991).

Public participation in FMA planning is now mandatory (Alberta Forestry, Lands and Wildlife 1990d, 1990e), but only after a legally binding FMA has been signed. It is limited to local participation and representation (Alberta Forestry, Lands and Wildlife 1990e: 20). The extent to which public input can influence companies to set aside areas of provincial ecological significance that have not already been identified by the government remains to be seen.

Should the government decide that certain areas must be withdrawn for other uses, revisions of forest management plans and annual operating plans can be required by the Minister. Environmental sensitivities regarding harvesting activities can be added by mutual agreement to existing planning and operating ground rules at any time or can be unilaterally imposed by cabinet.

It must be noted that under The Forests Act the Minister, through the Forest Land Use Branch of the Alberta Forest Service, is responsible for directing and coordinating the integrated resource management of Crown lands in the Green Area, including waste management, grazing and protection of land, water and wildlife resources.

The Forests Act may serve to protect the ecological integrity of forest ecosystems. The concept of "perpetual sustained yield" is being examined in the courts. The issues are: what is meant by this term and to what degree can forest management agreements provide for this (Van Tighem 1991: pers. comm.).

Alberta Tourism, Parks and Recreation

Alberta Tourism, Parks and Recreation (Alberta Recreation and Parks was amalgamated with Alberta Tourism in February 1992) administers a parks system consisting of land and water managed for the benefit of present and future generations, and dedicated to the people of Alberta and others who may use them for their healthful enjoyment and appreciation. There are four broad program objectives that guide the development and management of this system. These objectives are designed to strike a balance among the Provincial Park Service's commitments to outdoor recreation, protection and conservation.

The four program objectives are:

1. Outdoor recreation - to provide a variety of intensive and dispersed outdoor recreation opportunities and related facilities and services to meet the outdoor recreation needs of Albertans.
2. Protection - to preserve and protect in perpetuity a system of representative, special and outstanding natural landscapes and features as well as landscape-related prehistoric, historic and cultural resources of Alberta.
3. Heritage Appreciation - to provide opportunities for Albertans and others to explore, enjoy, understand and appreciate the natural, historical and cultural heritage of Alberta, and to enhance public awareness of our natural environment and our relationship with it.
4. Tourism - to support the tourism industry of the province by encouraging residents and visitors to discover and enjoy the natural, historical and cultural resources of the province, through a variety of recreation opportunities, facilities and accommodation services (Alberta Recreation and Parks, 1990b).

Alberta Tourism, Parks and Recreation administers four categories of protected areas in the provincial parks system: ecological reserves, wilderness areas, provincial parks and provincial recreation areas.

1. Provincial Parks integrate and protect outstanding recreational landscapes and resources and provincially significant natural landscapes and features to provide quality recreational and educational experiences (Duffin 1991:1).
2. Ecological Reserves are areas selected as representative or special natural landscapes and features of the province, which are protected as examples of functioning ecosystems, as gene pools for research and for education and heritage appreciation purposes (Duffin 1991:1).
3. Wilderness Areas are large areas of undeveloped land retaining their primeval character and influence without permanent improvements or human habitation. Natural processes in these areas continue relatively unaffected by human influences. Visitors travel by foot to experience solitude and personal interaction with nature in wildland settings (Duffin 1991:1).

4. Provincial Recreation Areas offer or support a wide diversity of intensive and extensive outdoor recreation opportunities in natural, modified or man-made settings (Duffin 1991:1).

Table 4-15 summarizes the number of and total area affected by each category of the Alberta Tourism, Parks and Recreation system. There is no subclassification of these categories, although two different types of ecological reserves are recognized. Swinnerton (1991: 6-7) compares the objectives of the four categories with respect to: protection, heritage appreciation, outdoor recreation and tourism. Ecological reserves primarily meet the protection objective while wilderness areas contribute to protection and to a lesser extent, outdoor recreation. Provincial parks contribute to all four, whereas recreation areas meet primarily outdoor recreation and tourism objectives (Alberta Recreation and Parks 1988).

Table 4-15
Alberta Tourism, Parks and Recreation's Parks System

	Number	**Total Area (km^2)**
Provincial Parks	63	1,424
Wilderness Areas	3	1,010
Ecological Reserves	12	248
Provincial Recreation Areas*	49	557
TOTAL	133	3,239

*Does not include provincial recreation areas in Kananaskis Country, includes six areas now encompassed by the Lakeland Provincial Recreation Area.

SOURCE: Provincial Parks Service, Alberta Tourism, Parks and Recreation

Alberta Provincial Parks

The Natural Resources Act of 1930 transferred control of the province's natural resources from the federal government to the province. In the same year the Provincial Parks and Protected Areas Act was enacted, and by 1932 four parks had been established: Aspen Beach, Gooseberry Lake, Park Lake and Saskatoon Island. In the 1950s the number of parks increased dramatically from four to 34, due to increased public demand for family recreation opportunities. Most of these first parks were small recreation areas serving local populations (Swinnerton 1991).

The formation of a Provincial Parks Board in 1951 helped in the allocation of lands for provincial parks and provided for greater protection of examples of Alberta's natural ecosystems. Today,

> *Provincial parks integrate and protect outstanding recreational resources and provincially significant natural landscapes and features to provide quality recreational and educational experiences (Tranter 1990).*

The following are preliminary draft purposes for provincial parks (Tranter 1990):

- To provide day use, facility-based camping and associated opportunities and backcountry travel and camping opportunities in areas of outstanding recreational potential in a natural setting.
- To provide a variety of natural environment-based recreation opportunities and services conducive to tourism development and promotion and, to encourage private sector involvement in the supply of complementary facilities and services within, or in association with, provincial parks.
- To provide opportunities for exploration of natural landscapes and features through a full range of interpretive and educational programs reflecting the diversity of resources and features within the system.
- To protect a system of provincially significant representative landscapes or environments which incorporate the greatest possible diversity of provincially significant biophysical resources.

The characteristic difference between provincial parks and the three other mechanisms is the dual purpose of protecting a system of provincially significant representative landscapes and environments that reflect the greatest diversity with respect to (1) biophysical resources, (2) landscape-related prehistoric and historic resources, while providing high-quality extensive and intensive outdoor recreation (Swinnerton 1991: 6). To provide opportunities for exploration, appreciation and enjoyment of the natural and historical aspects of the areas and recreational activities "compatible with the protection of these heritage resources," facilities, services and educational and interpretive programs are provided.

Legislation and Government Administration

Alberta Tourism, Parks and Recreation administers provincial parks through the Provincial Parks Act (RSA 1980) and its pursuant General Regulations and Dispositions Regulations.

Section 3 of the Act states that:

Parks shall be developed and maintained

(a) for the conservation and management of flora and fauna,

(b) for the preservation of specified areas and objects therein that are of geological, cultural, ecological or other scientific interest, and

(c) to facilitate their use and enjoyment for outdoor recreation.

Several sections of the Act outline the activities over which the Minister has jurisdiction and responsibility for the designation and management of parks and recreation areas, including:

- The power of the Minister to establish, develop and maintain a system and classification of parks and recreation areas (Section 9(a)).
- The duty of the Minister of Tourism, Parks and Recreation to administer, plan, develop and maintain parks (Section 9(b)).
- The power of the Minister of Tourism, Parks and Recreation to make regulations pertaining to permitted activities including recreational (hunting, fishing boating, vehicle use, fires, camping), commercial, scientific research, facility construction, provision of services and charging of fees (Section 11).
- The Minister may by order close all or part of a park or recreation area for any periods considered necessary and zone any portion of the park or recreation area to regulate or confine various uses of its land and water resources (Section 13).
- The powers of the park rangers to inspect, maintain and restrict activities which are dangerous to life or property in the park or detrimental to the use and enjoyment of the park or recreation area by other persons or which are in contravention of the Provincial Parks Act and regulations or any other Act or regulations (Section 16).
- Fines of up to $2000 or six months imprisonment for contravention of the Act or its regulations.

Distribution and Natural Region Representation

There are 63 provincial parks found throughout Alberta, ranging in size from less than 1 km^2 to more than 500 km^2. In total they represent two-tenths of 1% of the province. Forty-six parks are less than 10 km^2 in area, 14 are between 10 and 100 km^2 and only three are larger than 100 km^2. Although the average size of the 63 parks is more than 20 km^2, the median size (the middle-ranked size) is a mere 3 km^2. One park, Peter Lougheed Provincial Park, accounts for almost 35% of the total area of all Alberta provincial parks and the five largest parks (Peter Lougheed, Cypress Hills, Lakeland, Notikewin and Lesser Slave Lake) represent almost three-quarters of the total provincial park area.

Table 4-16 and Figure 4-6 show Alberta's provincial parks by natural region. A complete listing of the parks and their sizes is found in Appendix B.

There is at least one park found in 12 of the 17 natural subregions of the province, with none found in five northern subregions: three of the Boreal Forest subregions (Subarctic, Hay River, Peace River Lowlands) and the two Canadian Shield areas (Kazan Upland and Athabasca Plain). The greatest concentrations of parks are found in the Mixedwood Boreal Forest (21), the Central Parkland (15) and the Mixed Grassland (8).

Lakeland Provincial Park is Alberta's newest provincial park, established by Order-in-Council in January 1992 (Government of Alberta 1992b). This 147-km^2 area lies east of the newly created 441-km^2 Lakeland Provincial Recreation Area, in the Mixedwood Boreal Forest subregion in northeastern Alberta. The Lakeland area is characterized by clear lakes with long sandy beaches, providing outstanding opportunities for water-based recreation (boating, fishing and swimming), and vast mixedwood boreal forests, supporting abundant wildlife populations and providing a wilderness setting. It has been traditionally used by a variety of outdoor recreation enthusiasts, and at the same time, by companies and individuals undertaking timber harvesting, petroleum and natural gas exploration and development, trapping and commercial fishing.

The addition of both areas increases the total area of the provincial "parks system" by 22%. The Alberta government has committed $20 million over eight years for this development, aimed at increasing recreational opportunities such as camping, boating, fishing, hiking, interpretation and environmental education services. Recreational activity in this part of Alberta had increased to such an extent that the

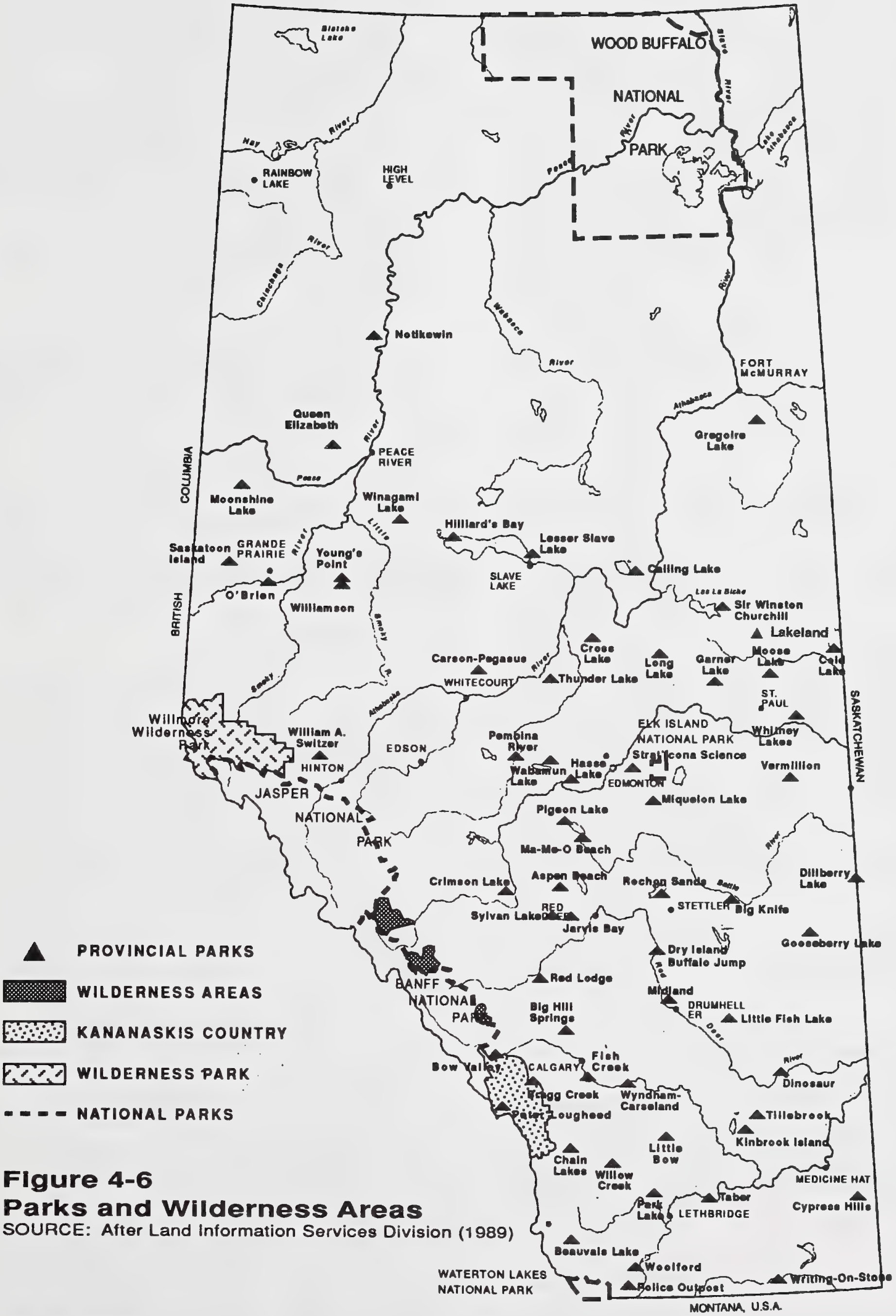


Figure 4-6
Parks and Wilderness Areas
SOURCE: After Land Information Services Division (1989)

roads and six provincial recreation areas in or near the designated Lakeland area were often crowded on weekends and holidays, raising concerns about compatibility of uses (among recreational users and between recreationists and natural resource industries operating in the area).

The Lakeland area was first given consideration for park development in the 1970s. An interdepartmental committee with representatives from Alberta Tourism, Parks and Recreation, and Forestry, Lands and Wildlife designated this area as a special integrated management unit with recreational uses having priority over other resource land uses. A Lakeland Resource Management Policy was approved in 1980 and the Lakeland Subregional Integrated Resource Plan (Alberta Forestry, Lands and Wildlife 1985b) in 1985, with the following resource and recreation objective:

> *To maintain and develop the widest possible range of recreation land uses within the Lakeland planning area. These range from major destination areas to areas set aside for wilderness recreation.*

In its information booklet on the Lakeland Provincial Park and Recreation Area proposed development (Alberta Recreation and Parks 1990b: 2), the department acknowledges the need for protection:

> *A need clearly exists to protect one of the province's significant natural regions and to integrate recreational activities in an environmentally responsible way.*

Activities incompatible with provincial park objectives will be permitted in the recreation area component. The park portion will protect a signifi-

Table 4-16
Distribution of Provincial Parks, Ecological Reserves, Wilderness Areas and Provincial Recreation Areas in Alberta, by Natural Region

Natural	Provincial Parks	Ecological Reserves	Wilderness Areas	Provincial Recreation Areas
		(No. sites:Area (km^2))		
Grassland				
Mixed*	8 : 89	1 : 11		2 : <1
Northern Fescue	2 : 8	1 : 22		4 : <1
Foothills*	4 : 79	0 : 0		2 : <1
Parkland				
Central	15 : 53	2 : 62		7 : 98
Foothills*	4 : 12	0 : 0		0 : 0
Peace R.	4 : 3	1 : 18		2 : <1
Foothills				
Main	3 : 63	1 : 8		5 : 3
Northern Outliers*	1 : 30	1 : 12		0 : 0
Boreal Forest				
Subarctic	0 : 0	0 : 0		0 : 0
Hay R.	0 : 0	0 : 0		0 : 0
Peace R. Lowlands	0 : 0	0 : 0		0 : 0
Mixedwood*	21 : 434	2 : 18		26 : 456
Rocky Mountain				
Montane*	3 : 152	2 : 58		1 : <1
Subalpine/Alpine	1 : 501	0 : 0	3 : 1010	0 : 0
Canadian Shield				
Kazan Upland	0 : 0	0 : 0		0 : 0
Athabasca Plain	0 : 0	1 : 38		0 : 0
TOTALS	**66*:1,424**	**12:247**	**3:1010**	**49:557**

* indicates natural subregion that contains part of or an entire park. The total number of parks is 63. Three straddle two subregions: Cypress Hills (Mixed Grassland and Montane subregion of the Rocky Mountains), Lesser Slave Lake (Mixedwood Boreal Forest and Northern Outliers of the Foothills) and Fish Creek (Foothills Grassland and Foothills Parkland).

cant representation of the Mixedwood Boreal Forest subregion as well as historical and cultural resources, with emphasis on providing recreational opportunities to appreciate and interact with the natural environment. The recreation area will provide a wide diversity of extensive and intensive outdoor recreation opportunities in a variety of settings. Both the government and private sector are expected to participate in the recreational developments.

Alberta provincial parks have not been differentiated, even though by virtue of size, location and the nature of the landscapes they encompass, there are major differences among them (see Alberta Department of Lands and Forests 1973). In 1979 Alberta Recreation and Parks established a park classification system that distinguished between preservation parks, wildland parks, natural environment parks and recreation parks (Alberta Recreation and Parks 1979b). The department rescinded this system in 1983, and replaced it with the current recognition of two categories: provincial parks and provincial recreation areas. A draft policy statement in 1986 identified two classes of parks: heritage and natural environment (Swinnerton 1991:51; Alberta Recreation and Parks 1985, 1986).

Protection and Management

Most of Alberta's parks are less than 10 km² in area, serving primarily intensive outdoor recreation needs. Generally, the larger the park, the greater the opportunity to provide a broad range of recreational opportunities, while ensuring relatively protected areas representing natural ecosystems. Areas within some of the larger provincial parks, by virtue of limited access, difficult terrain or due to management strategies, exist in a relatively natural state. Most are too small to provide an adequate base for wildlife conservation (Swinnerton 1991:9). Webb (1987) discusses size and distribution factors that contribute to the protection value of natural areas.

The degree of development in Alberta's provincial parks ranges from simple day use facilities to intensively built up areas. There may be camping and trailer sites (unserviced and serviced), primitive toilet facilities or modern washrooms, firepits, trails, boat launches and developed beach areas. Various services, developments and educational programs may occur in a provincial park, including ski hill development (Cypress Hills) and cottage lot development (Dillberry Lake).

The department has initiated a program of privatizing many of the services provided in provincial parks: campground maintenance, repairs, janitorial services, landscaping, waste disposal and campground maintenance. The department has significantly increased the use of volunteers in the operation and delivery of programs in Alberta's provincial parks and their use for special events.

In 1990/91 (Alberta Recreation and Parks 1991a), Alberta's provincial parks and provincial recreation areas recorded 1.03 millions individual camper nights (defined as one person, camping for one night). An additional 5.31 million day visits were recorded (excluding Kananaskis Country).

Some of Alberta's provincial parks protect provincially, nationally or internationally recognized areas. Examples are the badlands, fossil beds and riverine communities of Dinosaur Provincial Park (a World Heritage Site); prehistoric features of Dry Island Buffalo Jump and Writing-On-Stone Provincial parks; and the grasslands of Cypress Hills Provincial Park.

Some activities are generally not allowed in provincial parks. Recreational (but not commercial) fishing is usually allowed whereas hunting and trapping are not allowed, except for management purposes. The taking of wildlife and plant material is prohibited. Firewood is provided by the Provincial Parks Service. The use of motorized boats and vehicles is restricted on a park by park and specific area basis. Camping, including primitive camping, is allowed only in designated areas. Logging has been allowed in Cypress Hills Provincial Park, grazing in Beauvais Provincial Park and helicopter landing and commercial ski training in the Prime Protection Zone of Peter Lougheed Provincial Park.

The Provincial Parks Service is currently preparing a zoning (outlining spatial and time segregation of uses) framework that will provide guidelines for managing sites in Alberta's provincial parks system. These will identify areas of natural significance, what emphasis will be placed on outdoor recreation versus protection and the level of development considered appropriate. A corporate policy document entitled *Foundations for Action* (Alberta Recreation and Parks 1988), based on extensive public consultation, was completed in 1990 but never made public. This document provided the basis on which system classification, planning and expansion were to be based.

Future Considerations

Alberta Tourism, Parks and Recreation has begun to develop a long-term management plan for Lakeland Provincial Park and Provincial Recreation Area. The public will be involved in that process. After the plan is approved, it is expected to take eight years to implement.

No other Alberta provincial parks are expected to be established in the near future, although a total of 2,005 km² has been reserved for 32 provincial parks and recreation areas throughout the province, including Castle River, Kootenay-Cline, Rumsey and North Porcupine. Twenty-three areas have Protective Notation (PNT) totalling 518 km² and nine have Consultative Notations (CNT) totalling 1,487 km² (Morrison 1991: pers. comm.). A complete listing of these proposed sites appears in Appendix B.

Ecological Reserves

The Ecological Reserves Program in Alberta received considerable impetus from the International Biological Program (IBP), that existed from 1964 to 1974 and was endorsed by Canada and 57 other nations (Taschereau 1985). The general aim of this 10-year program was

> *to ensure the worldwide study of (a) organic production on the land, in fresh waters and in the seas, and the potentialities and uses of new as well as of existing natural resources, and (b) human adaptability to changing conditions (Worthington 1975).*

To achieve these international objectives on a national scale, the Canadian International Biological Program for the Conservation of Terrestrial Communities (IBP-CT) subcommittee was formed. At the end of the program in 1974, the Canadian IBP-CT had identified 147 areas of biological significance in Alberta. Some of these sites were established as ecological reserves, beginning in 1987.

The characteristic difference between ecological reserves and the three other mechanisms is that recreation is not a primary or even secondary objective. The main objective for ecological reserves is the protection of the natural resource features of representative and special examples of natural ecosystems to ensure the perpetuation of "genetic materials" and the ecological units themselves. Opportunities for unstructured exploration and appreciation of the areas, and in some cases through formal interpretive and education programs, will be allowed to the extent they are compatible with the protection objectives. The same restrictions apply to permitting nonconsumptive, nature-oriented recreation and tourism opportunities (Swinnerton 1991: 6).

Two types of ecological reserves are recognized:

1. Representative Ecological Reserves contain examples of the diverse landscapes and biological communities of a particular biogeographical zone of the province.
2. Special Ecological Reserves contain unique or exceptional biological or geological features, or offer an opportunity to study the recovery of a natural area modified by man.

Legislation and Government Administration

Responsibility for establishing and managing ecological reserves is shared between Alberta Tourism, Parks and Recreation and Alberta Forestry, Lands and Wildlife, with overall program coordination and legislative responsibility resting with the Minister of Tourism, Parks and Recreation. Onsite management of individual reserves is normally assigned to the agency managing the area at the time it was established as an ecological reserve. For ecological reserves located in the Green Area, the managing agency is normally the Alberta Forest Service, and for the White Area, Public Lands Division.

The Wilderness Areas, Ecological Reserves and Natural Areas Act sets out the parameters within which ecological reserves are to be managed. Several key features of the Act are outlined below.

The Act (Section 3(1)) provides for the designation by Order-in-Council of any area of public land as an ecological reserve that:

(a) is suitable for scientific research associated with the studies of natural ecosystems,

(b) is a representative example of a natural ecosystem in Alberta,

(c) serves as an example of an ecosystem that has been modified by man and that offers an opportunity to study the recovery of the ecosystem from that modification,

(d) contains rare or endangered native plants or animals that should be preserved, or

(e) contains unique or rare examples of natural biological or physical features.

The Act requires the Lieutenant Governor in Council to establish a 12-member advisory committee for ecological reserves (and wilderness areas); made up of six government employees (two representatives from Alberta Tourism, Parks and Recreation, one from Alberta Culture and Multiculturalism, and three from Alberta Forestry, Lands and Wildlife), and six persons not employed by the government (Section 4). This committee was reappointed in March of 1992 for a three-year term.

The advisory committee receives and considers requests from the public regarding ecological reserves (and wilderness areas) and may make recommendations to the Minister regarding establishing new areas, adding or withdrawing land from existing areas or making regulations for their management and use and/or for controlled buffer zones surrounding them (Section 2 (7)).

The recommendations by the advisory committee must be referred by the Minister to Executive Council (Alberta cabinet) for its consideration and a copy presented to the Legislative Assembly (Section 2 (8 and 9)).

The Act also requires public notification to establish, disestablish or alter an ecological reserve (Section 3.1(2 and 3)).

Public hearings may be authorized by the Minister regarding proposed ecological reserves (or wilderness areas) or changes to existing ones or any other matter pertaining to the administration or management of ecological reserves (or wilderness areas) (Section 4(2)); the Environment Council of Alberta may be called on to hold hearings on proposed new areas or changes to existing ones (Section 4(1)).

Activities allowed in an ecological reserve (or wilderness area) by the Minister or designate include measures or programs for the management and preservation of the animal and plant life and the environment, for research that does not involve physical disturbance of the area, for public education and interpretation, or generally for the protection of the area (Section 5).

Uses prohibited in ecological reserves are: hunting, trapping, fishing, aircraft use, littering, taking plant or animal life, excavation or removal of fossils, disposal of harmful materials, operation of motorized vehicles or motor boats (except on designated routes), fires, (Section 8), all Crown dispositions (Section 7(1)), and construction, repair and operation of public works, roads, structures etc. (Section 7(3)). Some of these uses may be permitted for management purposes.

It is the duty of the Minister of Tourism, Parks and Recreation to withdraw, cancel or terminate, as soon as possible and as much as is practicable, land dispositions held by private interests for such uses as timber harvesting and grazing (Section 6 (1)). None of these interests may be continued or renewed unless the Minister gives written consent.

The Lieutenant Governor in Council can designate any public land adjoining an ecological reserve as a controlled buffer zone (Sec. 12.1).

Actions that are allowed by the Minister or designate include: preservation programs as listed in Section 5, forest fire prevention and suppression, prevention of damage to natural resources and property, and emergencies involving people's health or safety (Section 8).

Fines for contravention of the Act are: not more than $1,000 or 60 days imprisonment for first offence, not more than $5,000 or 120 days for the second, and imprisonment for six months for individuals or fines of not less than $10,000 to not more than $50,000 for corporations for third or subsequent offences.

Distribution and Natural Region Representation

There are 13 ecological reserves (see Figure 4-7 and Table 4-17) representing 11 of the 17 natural subregions of Alberta. Subregions not represented include: Foothills Grassland, Foothills Parkland, Subarctic, Hay River and Peace River Lowlands subregions of the Boreal Forest, and the Kazan Upland of the Canadian Shield. Each of three subregions are represented by two sites: Central Parkland, Mixedwood Boreal Forest and the Montane subregion of the Rocky Mountains.

Alberta's ecological reserves range in size from 8.6 km^2 to almost 38 km^2, with the average size just over 20 km^2. Almost one-third of the total area designated as ecological reserves in Alberta is found in the Parkland natural region, where a total of 80 km^2 is designated as three reserves. The Rocky Mountains are represented by two sites that cover a total of 58 km^2 in the Montane subregion—this is about 25% of the total provincial area of ecological reserves. Other natural region representation is: 38 km^2 in the Canadian Shield (comprising 15% of the provincial total for ecological reserves); 33 km^2 in the Grassland (13% of total); 20 km^2 in the Foothills (8% of the total); and 18 km^2 in the Boreal Forest (6% of the total). A description of each reserve area appears in Appendix C.

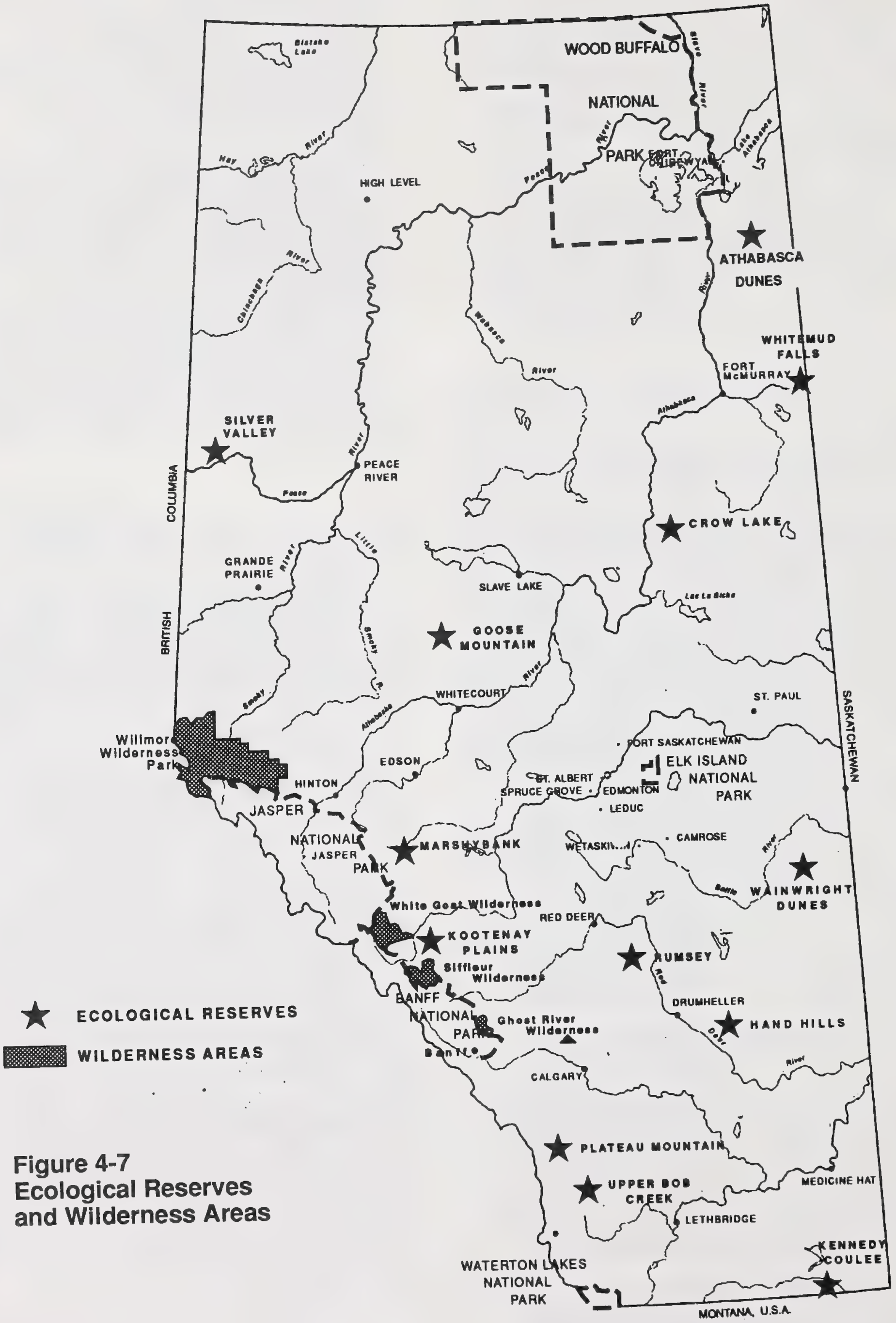


Figure 4-7
Ecological Reserves
and Wilderness Areas

Table 4-17
Ecological Reserves, by Natural Region

Natural Region	Ecological Reserves	Area (km^2)
Grassland		
Mixed	Kennedy Coulee	10.68
Northern Fescue	Hand Hills	22.29
Foothills		——
Parkland		
Central	Wainwright Dunes	28.21
	Rumsey	34.32
Foothills		——
Peace R.	Silver Valley	18.05
Foothills		
Main	Marshybank	8.30
Northern Outliers	Goose Mountain	12.46
Boreal Forest		
Subarctic		——
Hay R.		——
Peace R. Lowlands		——
Mixedwood	Crow Lake	9.38
	Whitemud Falls	8.65
Rocky Mountain		
Montane	Kootenay Plains	32.04
	Upper Bob Creek	26.01
Subalpine/Alpine	Plateau Mountain	
Canadian Shield		
Kazan Upland		——
Athabasca Plain	Athabasca Dunes	37.70
TOTAL AREA		**271.32**

Protection and Management

Boundary signs are in place for about three-quarters of the ecological reserves. Hunting is not allowed except when authorized by the Minister (e.g., Upper Bob Creek for elk management purposes, Nordstrom 1991: pers comm.).

Some boundaries of ecological reserves are fenced to keep cattle within the reserve area (e.g., Hand Hills, Rumsey), while others are fenced to keep cattle out (e.g., Kennedy Coulee). Cattle grazing within reserves is considered a grassland management strategy that simulates the role of native grazers, such as bison, who no longer inhabit or are poorly represented in the reserve area.

Some ecological reserves are in good condition because of conscientious lessees and operators in the area. While some grazing lessees control cattle access to watercourses, others have not, resulting in detrimental effects on streamcourses. The Minister has rarely exercised the authority under the Act to terminate dispositions and renew them only under his signature.

Regulations pertaining to land use practices, standard protective measures and buffers for ecological reserves have not been written, even though there are land use conflicts on some sites—for example, involving hunting, all terrain vehicles (which are prohibited) and cattle grazing. Seven management plans are being prepared. Draft plans have been completed for Crow, Goose, Hand Hills, Kennedy Coulee (with Milk River Natural Area) and Upper Bob Creek, and work just begun on plans for Silver Valley and Wainwright Dunes. These plans will identify the objectives and guidelines for managing each ecological reserve and may include recommendations regarding buffer zones (no buffer have been established).

An interdepartmental committee is developing a review and approval procedure for management plans for ecological reserves, and a research and collecting policy. The extent or nature of educational or scientific initiatives in Alberta's ecological reserves is unknown, but an annotated bibliography of past research in reserve areas is being prepared (Nordstrom 1991: pers comm.).

The Act is being reviewed to clarify permitted activities and thereby strengthen it.

Future Considerations

The systems goal for ecological reserves is to establish at least one ecological reserve in each of Alberta's 17 natural subregions (Alberta Provincial Parks Service 1991: pers. comm.). The commitment to complete this process was stated by the Minister of Tourism, Parks and Recreation on March 11, 1992 (Government of Alberta 1992b).

Three areas under reservation will be designated (Government of Alberta 1992b). One is the 19.42-km^2 Ross Lake ecological reserve in the Foothills Grassland subregion about 80 km south of Cardston (south of the McIntyre Ranch), near the Alberta-Montana border. Pachal (1992) states that Ross Lake is the largest remaining block of foothills fescue grassland suitable for preservation in Alberta. Another area is the 22.73-km^2 Middle Sand Hills site about 40 km northeast of Medicine Hat in the Mixed Grassland subregion. Egg Island, a tiny island in Lake Athabasca about 50 km northeast of Fort Chipewyan and the only known nesting site in Alberta of the Caspian Tern, a rare species, will also be designated.

Other potential sites are listed in Pachal (1992).

Wilderness Areas

Wilderness Areas in Alberta are intended to be:

> *Large tracts of undeveloped land retaining their primeval character and influence without permanent improvements or human habitation, where natural processes continue relatively unaffected by human influences and where visitors travel by nonmechanized means and experience solitude and personal interaction with nature (Swinnerton 1991: 6).*

The preamble to the original Wilderness Areas Act (Statutes of Alberta 1971) embodies the motivation behind the establishment of wilderness areas in Alberta. It reads:

> *Whereas the continuing expansion of industrial development and settlement in Alberta will leave progressively fewer areas in their natural state of wilderness; and*
>
> *Whereas it is in the public interest that certain areas of Alberta be protected and managed for the purpose of preserving their natural beauty and primeval character and influence and safeguarding them from impairment and industrial development and from occupation by man other than as a visitor who does not remain; and*
>
> *Whereas to carry out those purposes it is desirable to establish and maintain certain areas as wilderness areas for the benefit and enjoyment of the present and future generations.*

The characteristic difference between wilderness areas and the three other mechanisms is that protection of wilderness landscapes and heritage is the primary objective (see Pachal 1992 for a comprehensive discussion of wilderness). Opportunities for exploration, appreciation, wilderness travel and camping are provided to the extent that they are compatible with and complementary to, the preservation of wilderness environments (Swinnerton 1991: 6).

Alberta Tourism, Parks and Recreation states the following three purposes for wilderness areas :

1. To protect provincially significant wilderness landscapes.
2. To provide opportunities for unstructured exploration and appreciation of the wilderness heritage of Alberta to the extent that is compatible with the preservation of wilderness environments.
3. To provide wilderness travel and camping opportunities where the recreational experience is characterized by solitude, challenge and personal interaction with the natural environment (Tranter 1990).

Legislation and Government Administration

Alberta Tourism, Parks and Recreation administers wilderness areas through the Wilderness Areas, Ecological Reserves and Natural Areas Act. Elements of the Act relating to the authority to designate or change areas and establish uses apply to both ecological reserves and wilderness areas, but the discretion afforded the Minister is greater for ecological reserves than for wilderness areas. Certain dispositions such as water management structures and oil and gas development can occur on the former but not in wilderness areas. People can only travel by foot in wilderness areas—the use of horses, other pack animals or any motorized vehicles is prohibited.

Distribution and Natural Region Representation

The three wilderness areas of Alberta are: Siffleur Wilderness Area, White Goat Wilderness Area and Ghost River Wilderness Area. These are listed in Table 4-18 and shown in Figures 4-6 and 4-7. All three areas are found in the Subalpine/Alpine natural subregions of Alberta within the Eastern Slopes region. A description of each area appears in Appendix D. Pachal (1992) notes that 802 km² of the original proposed White Goat Wilderness Area remains without legal protection.

Table 4-18
Distribution of Wilderness Areas in Alberta, by Natural Region

Natural Region	AREA (km²)
Rocky Mountain	
Subalpine/Alpine	
Siffleur Wilderness Area	412
White Goat Wilderness Area	445
Ghost River Wilderness Area	153
ALBERTA TOTAL	**1,010**

Protection and Management

Wilderness areas are given the highest degree of legislated protection in Alberta (Swinnerton 1991: 10). Regulations restricting land use within wilderness areas are the same as those in place for ecological reserves, except that only foot travel is allowed in wilderness areas. The Minister could specifically authorize other forms of travel if it were for specific preservation programs or activities, forest fire prevention or suppression, prevention of damage to natural resources or property, or search and rescue operations.

Alberta's wilderness areas are not subject to significant use or degradation because of the lack of direct highway vehicle access, difficult terrain and lack of developed trails. Trail access points are signed and there are trailhead registration boxes. There is little information on use—a rough estimate is that use in each area does not exceed 100 camper nights per year. The Ghost Wilderness Area is used the least and the White Goat the most. There is very occasional illegal use of these areas by horse outfitters and recreational vehicle operators (Armstrong 1991: pers. comm.).

Regular patrols and trail maintenance were initiated by Provincial Parks Service staff in the mid-1980s but, with budget constraints, have been almost eliminated. This included cleanup of horse outfitter camps that predated official designation of these areas. Between 1984 and 1990 biophysical inventory studies and vegetation mapping were completed for the three areas as well as two studies of resident caribou populations, which are considered endangered (Posey 1992). Inventory and monitoring of the areas' biological resources has not continued (Armstrong 1991: pers. comm.).

Future Considerations

Management plans are being drafted for Alberta's wilderness areas.

There are no new wilderness areas being considered or proposed although public recommendations were made for a Kakwa Wilderness Area in 1974 and a Boreal Wilderness Area in 1979 (Pachal 1992).

Provincial Recreation Areas

"Provincial recreation areas offer or support a wide diversity of extensive and intensive outdoor recreation opportunities in natural, modified or man-made settings" (Tranter 1990).

The characteristic difference between provincial recreation areas and the three other mechanisms is that providing recreation is a primary objective. They provide for exploration and appreciation of natural, historical and cultural environments, in unstructured ways as well as through interpretive and educational programs. Mechanized and nonmechanized activities are permitted in these areas, as well as consumptive and nonconsumptive uses. The opportunities and services provided by provincial recreation areas and associated programs and facilities are seen to be conducive to tourism promotion and development (Swinnerton (1991: 6).

There are four preliminary draft objectives for provincial recreation areas:

1. To provide day use, facility-based camping and associated opportunities and a variety of dispersed outdoor recreation opportunities in natural, modified or man-made settings.
2. To provide a variety of recreation opportunities and services conducive to tourism development and promotion and, encourage the development of private sector involvement in supplying complementary facilities and services.
3. To provide opportunities for exploration and appreciation of natural environments through interpretive and educational programs reflecting the diversity of resources and features.
4. To protect locally, regionally or provincially significant natural landscapes and/or significant or unique natural features (Tranter 1990).

The Provincial Parks Act, under which provincial recreation areas are administered, states that they are to "be developed and maintained to facilitate their use and enjoyment for outdoor recreation" (Section 3).

Legislation and Government Administration

Provincial recreation areas are legislated under the Provincial Parks Act, and regulations pertaining to their use are the same as for provincial parks (General Regulations and Dispositions Regulations). Relevant sections relating to protection are the same as for provincial parks and are outlined in that section.

Distribution and Natural Region Representation

There are 49 provincial recreation areas in Alberta (Figure 4-8) ranging from .01 to 441 km², encompassing a total area of 557 km². This excludes those found in Kananaskis Country. Forty-three (or 87%) of the areas are less than 1 km², five are between 1 and 10 km² and only two (the Cooking Lake-Blackfoot Grazing, Wildlife and Provincial Recreation Area, and Lakeland Provincial Recreation Area) are more than 10 km². A summary of the distribution of provincial recreation areas is found in Appendix B.

In May 1991, 28 Alberta Environment recreation sites were transferred from Alberta Environment to the Provincial Parks Service. These small sites are located on 19 lakes and rivers across the province and provide a variety of water-based recreation opportunities such as boating, fishing, windsurfing and swimming. Many are found on lakes and rivers that have water management structures associated with them, such as dams and canals. Alberta Tourism, Parks and Recreation also assumed the responsibility for 86 Alberta Transportation sites—small, roadside reststop areas. These will be designated as provincial recreation areas (Morrison 1991: pers. comm.).

Protection and Management

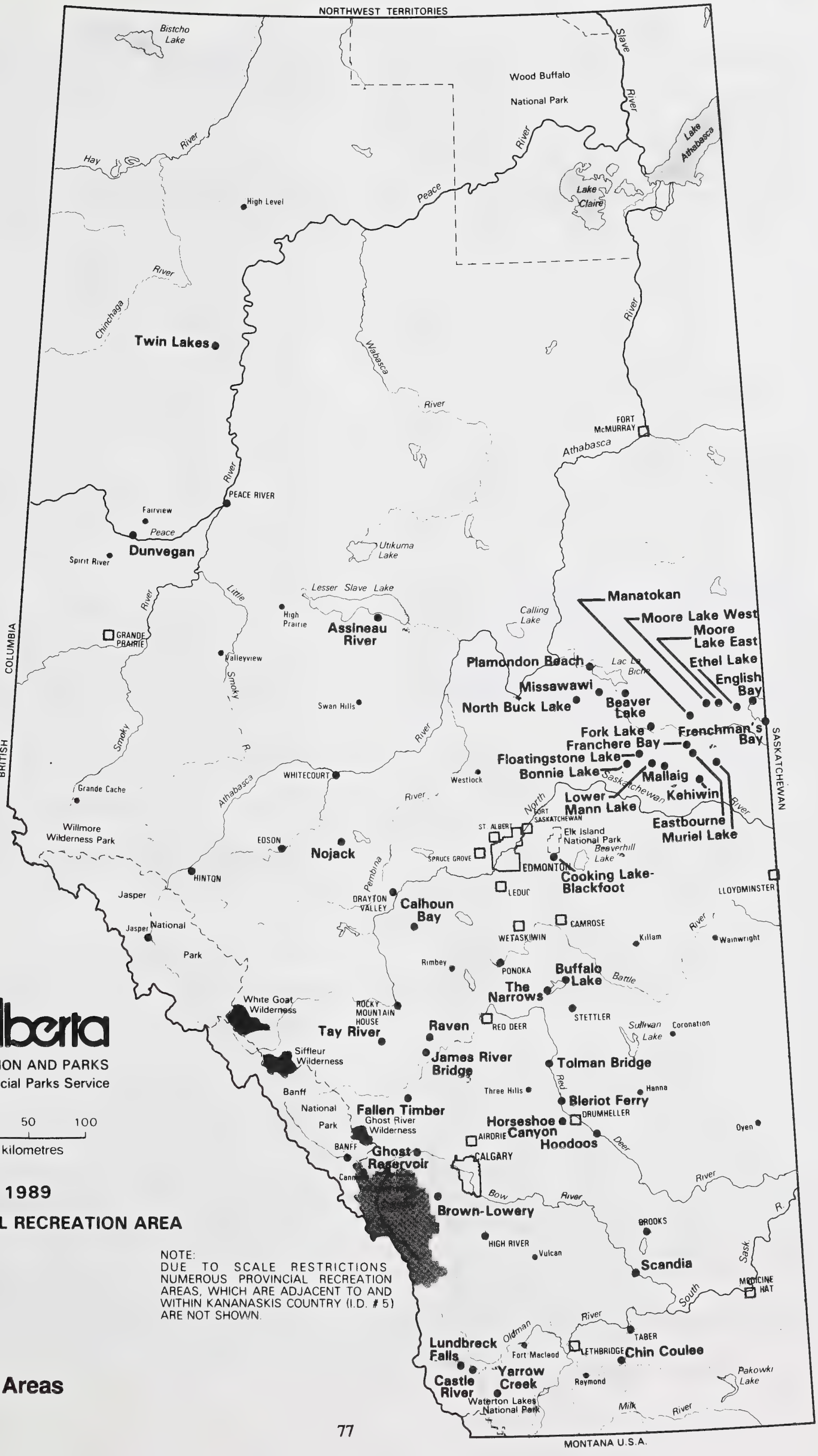
Because most provincial recreation areas are parking lot size and the focus of fairly intensive, outdoor recreational use, they provide little protection to the natural areas they encompass. They are maintained and patrolled by Provincial Parks Service staff and/or local volunteers.

There is only one multiple use provincial recreation area that allows a range of uses—this is the 97-km² Blackfoot Grazing, Wildlife and Provincial Recreation Area. The other sites have few nonrecreational uses.

Future Considerations

Two small sites will be added to the system: Sun Haven and Prospectors Point, both in the Central Parkland subregion. The 28 Alberta Environment sites and the 86 Alberta Transportation sites will be designated as provincial recreation areas. Negotiations are under way to transfer forest recreation area sites that support auto-access campgrounds from Forestry, Lands and Wildlife to Alberta Tourism, Parks and Recreation, to be administered as provincial recreation areas.

No new provincial recreation area sites are being planned, except those within the newly created Lakeland Provincial Recreation Area . The department has placed Consultative or Protective Notations on a total of 32 sites covering 2,005 km² for either future provincial parks or provincial recreation areas (Morrison 1991: pers. comm. - see Appendix B for a listing of these sites).



Alberta

RECREATION AND PARKS
Provincial Parks Service

0 50 100
kilometres

1989

- PROVINCIAL RECREATION AREA

NOTE:
DUE TO SCALE RESTRICTIONS NUMEROUS PROVINCIAL RECREATION AREAS, WHICH ARE ADJACENT TO AND WITHIN KANANASKIS COUNTRY (I.D. # 5) ARE NOT SHOWN.

Figure 4-8
Provincial
Recreation Areas

Kananaskis Country

In 1979 Kananaskis Country was declared a special recreation management area by Order-in-Council. Most of its 4250-km² area is found in the Rocky Mountain Subalpine and Alpine subregions (about 85%) with about 10% in the Montane subregion and about 5% in the Main Foothills subregion. Kananaskis Country boundaries coincide with those public lands under the jurisdiction of Forestry, Lands and Wildlife, and Alberta Tourism, Parks and Recreation. Alberta Tourism, Parks and Recreation is responsible for the overall coordination of activities in the area, many of which are recreational. The Kananaskis Country Interdepartmental Committee oversees all activities in this area. It has representatives from all government agencies with interests in the area, including forestry, wildlife, water resources, mineral resources, public lands, recreation and parks. Administration is by a managing director who reports directly to the Minister of Tourism, Parks and Recreation.

Kananaskis Country is an integrated resource use area—an Integrated Resource Plan for this area was approved in 1986. Activities such as forestry, ranching, and oil and gas exploration and extraction are permitted, in addition to the wide range of recreational opportunities that are available (Alberta Recreation and Parks 1989).

Protection of representative natural areas in Kananaskis Country is achieved by mechanisms discussed elsewhere in this report. There are three provincial parks in Kananaskis Country: Peter Lougheed (the largest provincial park in the province), Bragg Creek and Bow Valley. In addition to providing opportunities for camping, hiking and other outdoor recreation, more than 75,000 people attended interpretive activities held at six campgrounds in 1989-90. Plateau Mountain Ecological Reserve and Sheep River Wildlife Sanctuary are also found in Kananaskis Country.

Most of Kananaskis Country is classified as a forest land use zone (FLUZ). Within this FLUZ, there are three smaller specific forest land use zones that allow snowmobile and/or off-highway vehicle use. There are 81 provincial recreation areas. During the 1989-90 fiscal year, 478,531 camper nights were recorded. Hunting and fishing are allowed, except in restricted ares. Accommodation facilities and recreational developments include a golf course, downhill skiing, cross-country and hiking trails, campgrounds, equestrian trails, interpretive trails, a resort hotel complex and stocked fish ponds. Pachal (1992) notes that significant areas within Kananaskis Country have been dedicated to wilderness recreation pursuits.

Alberta Environment

The mission of Alberta Environment is "to achieve protection, improvement and wise use of Alberta's environment now and in the future" (Alberta Environment 1988). The broad operating mandate for this department is given in The Department of the Environment Act, which is currently being revised. Under regulations of this act, the department has created 10 Restricted Development Areas (RDAs). The Minister must give his consent to proposed activities that could adversely affect the natural resources adjacent to, or within the RDA. Alberta Environment is also responsible for water management in the province, under the Water Resources Act, which is also being revised. A set of water management principles forms part of the department's water management policy.

The Department of the Environment Act covers a broad range of environment issues including: conservation, management and utilization of natural resources; prevention and control of pollution; prevention and control of noise levels as they affect the environment in the vicinity of the noise-making operations; any operation that adversely affects or may affect the quality or quantity of any natural resource; the preservation of natural resources for their aesthetic value; laws in force in Alberta that relate to or directly or indirectly affect the ecology of the environment or natural resources (Section 2).

The Department of the Environment Act and Restricted Development Areas

Under Section 16 of the Act, the Lieutenant Governor in Council may, by regulation, establish a Restricted Development Area (RDA) or Water Conservation Area (WCA). The two main reasons for the designation of RDAs are the need for special environmental management of certain areas and for protection of transportation/utility corridor (TUC) lands.

The Act stipulates the purposes of such areas:

(a) preventing, controlling, alleviating or stopping the destruction, damage or pollution of any natural resource in or adjacent to the area,

(b) protecting a watershed in or adjacent to the area,

(c) retaining the environment of the area in a natural state or in a state suitable for recreation or the propagation of plant or animal life, and

(d) preventing the deterioration of the quality of the environment of the area by reason of the development or use of the land in the area incompatible with the preservation of that environment (Section 16 (1)).

The area can also be set up to confine or separate from a RDA, any operation, activity, use, development or occupation that may or does adversely affect the area's natural resources' quality or quantity. It was also set up to confine or separate from the areas any emission, discharge, noise or other environmental pollutant or pollution source. The same regulations indicate that establishing the RDA or WCA can provide for the "control, restriction or prohibition of any kind of use, development or occupation of land in the area" (Section 16 (2)).

Distribution and Natural Region Representation

In total, 13 RDAs were created, but three entire RDAs (Pinehurst Lake, Blue Ridge and Lethbridge) as well as a large part of the Calgary RDA have been deregulated (Murphy 1991: pers. comm.). The 10 remaining RDAs exist under separate regulations. There are six in the Edmonton area, two in Calgary, one in Fort McMurray and one on Turtle Mountain, the site of the Frank Slide. These are listed in Table 4-19. No water conservation areas have been established under this Act.

Protection and Management

Each RDA is established under its own set of regulations that outline which uses must receive written consent of the Minister before they can be undertaken. In most cases existing uses are permitted to continue without the Minister's permission.

The three Transportation/Utility Corridor RDAs ring the cities of Edmonton and Calgary. In Edmonton and Calgary these RDAs have been reduced to include only lands required for the utility lines and roads—each consists of a ring about 600 m wide. These were created to address the need for coordinated and regulated development of a ring road and major utilities and to provide buffer lands to these uses.

The Calgary RDA includes three environmentally sensitive areas: Bow River north, Bow River south

Table 4-19
Restricted Development Areas in Alberta, by Natural Region

Natural Region	RESTRICTED DEVELOPMENT AREA	AREA (km^2)	PURPOSE
Parkland			
Central	Capital City Park	10	Recreation/Environmental
	Edmonton	60	TUC*
	Edmonton-Ft Saskatchewan	32	Environmental
	Edmonton-Devon	30	Environmental
	Sherwood Park West	20	TUC*
	Strathcona	1	Environmental
Foothills	Calgary	80+77	TUC*+Environmental
	Fish Creek	4	Environ./Recreational
Boreal Forest			
Mixedwood	Fort McMurray	2.2	Environmental (Flooding)
Rocky Mountain			
Montane	Turtle Mountain	22	Tourism/Environmental - (Landslide)
TOTAL AREA		**338**	
Total Environmental only		**178**	

*TUC = Transportation/Utility Corridors

and the Elbow River. The Fish Creek Park RDA is a small corridor that includes riparian habitat along a stretch of the creek in southwest Calgary. The valley is susceptible to flooding and it was felt inadvisable to permit further development of lands for residential, commercial and industrial purposes. As all of the land in the Fish Creek Park RDA has been purchased and turned over to Alberta Tourism, Parks and Recreation for Fish Creek Provincial Park, deregulation is likely.

The Turtle Mountain RDA, located at the massive rock slide at Frank, Alberta, includes lands considered an historical resource. The mountain face, where the slide started, and the huge area covered by broken rock, are protected for cultural, educational and tourism purposes.

The Capital City Recreation Park RDA and Edmonton-Devon, Edmonton-Fort Saskatchewan and Strathcona RDAs include the North Saskatchewan River valley and some upland.

RDAs do not prohibit all uses, but rather enable the department and the Minster an opportunity to address environmental impacts of land use change proposals on a case by case basis. Ministerial consents on these RDAs are common—between 1974 and 1989 there were more than 2,600 consents granted, mostly in the Calgary (1,300) and Edmonton (645) RDAs (Alberta Environment 1990: 54).

Future Considerations

There are no plans to extend the RDA designation to other river valley or TUC areas in Alberta. In fact they are gradually being deregulated with the responsibility being assumed by the municipalities directly affected (Murphy 1991: pers. comm.).

The Water Resources Act

The Water Resources Act provides the legal mechanism for the allocation and management of water in Alberta. It also provides for the use of water to enhance aquatic environments or protect them as they are, such as for in-stream needs. Section 11(1), parts (b) and (c) state that a person may acquire

(b) a licence to impound water for the purpose of water management, flood control, erosion control, flow regulation, conservation, recreation or the propagation of fish or wildlife or for any like purpose;

(c) a licence to use water in its natural state for the purpose of conservation, recreation or the propagation of fish or wildlife or for any like purpose.

This provision has not been widely used by the department or conservation groups in Alberta. In 1985 Trout Unlimited was unsuccessful in obtaining a licence to maintain in-stream flows of the Highwood River, for the purposes of maintaining and enhancing fisheries habitat (Szabo 1992: pers comm.).

The Water Resources Act is being revised. In his announcement on March 11, 1991, the Minister of Environment stated that based on extensive public review, it is time a new Act was developed because the existing Act is a mechanism for licensing consumptive use of water; "allocating water supplies until they are exhausted." He said the new Act will recognize certain flow quantities are needed to maintain the overall health of rivers and streams and the fish and wildlife they support, as well as address groundwater use, wetland drainage and lake management.

> *The new legislation will address these deficiencies in order to meet the challenge of protecting the ecological integrity of Alberta's water resources for future generations (Klein 1991: 16).*

Water Resource Management Principles for Alberta

Alberta Environment has also developed *Water Resource Management Principles for Alberta* (Alberta Environment 1989), which provide further interpretation of its "commitment to a program of balanced economic growth, the general welfare of Albertans and the present and future quality of life" as overriding considerations in water management. It further states that "The supply of good quality water should not be a limiting factor in achieving these economic and social objectives" (Alberta Environment 1989: 9).

These principles discuss water as a resource as well as watercourses, whose assimilative or self-purification capacity "must be regarded as a natural resource that is legitimate to use." The principles state that this use must "never cause any break in the ecological cycles that ensure the self-purification process" (Alberta Environment 1989: 12). Water uses are prioritized, with conservation uses receiving lowest priority. Strategies that specifically protect river and lake ecosystems are not included.

Wetlands Policy of the Alberta Water Resources Commission

In the spring of 1990, the Interdepartmental Wetland Policy Steering Committee of the Water Resources Commission published a draft policy for the management of wetlands in the settled area of Alberta (Alberta Water Resources Commission 1990). A guiding principle is to "ensure conservation and management of wetland resources in the settled area of Alberta to sustain agricultural, environmental, social and economic benefits that wetlands provide" (Alberta Water Resources Commission 1990: 2). Among the various proposed strategies are: no draining of permanent sloughs and marshes, financial and other incentives provided to landowners to maintain nonpermanent and wetland margins, and public lands containing wetlands should be maintained in public ownership. The draft policy received extensive public review and is being finalized by the Water Resources Commission (see Alberta Water Resources Commission 1991 for public comments). The Commission will then recommend to the Alberta cabinet that it approve the policy.

Alberta Culture and Multiculturalism

Alberta Culture, under the Historical Resources Act has provided protection to several natural sites in Alberta. This is because this Act provides a broad definition of historic resources that encompasses both human and natural history features, and because the Minister has considerable discretion in how these assets may be designated, and in some cases acquired. The history and use of the Historical Resources Act provides an example of a process that succeeds in affording protection for Alberta's heritage resources.

In the early 1970s the Heritage Resources Branch was established to conduct surveys to assess Alberta's historic resources. The department was concerned with preserving, through orderly designation and protection, representative examples of Alberta's heritage (Alberta Culture 1980). The process began with designating buildings that were quickly disappearing, due to rapid growth of Alberta's cities.

Under Section 2 of the Historical Resources Act, the Minister is responsible for:

(a) the coordination of the orderly development,
(b) the preservation,
(c) the study and interpretation, and
(d) the promotion of appreciation
of Alberta's historic resources.

Legislation and Government Administration

The Historical Resources Act begins by providing broad definitions:

(f) "historic resource" means any work of nature or of man that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest, including, but not limited to, a palaeontological, archaeological, prehistoric, historic or natural site, structure or object;

(g) "historic site" means any site which includes or is comprised of an historical resource of an immovable nature or which cannot be disassociated from its context without destroying some or all of its value as an historical resource and includes a prehistoric, historic or natural site or structure (Section 1(f) and (g)).

The Minister's powers are defined in Section 6 of the Act. These include the power to classify, preserve, index and catalogue the historic resources and other property designated under the Act. The Minister can also make regulations fixing the times, terms and conditions of public access to collections, property and locations under his/her control, as well as regulations for use and protection.

The Act also provides the Minister with the option of appointing a Historic Sites Coordinating Committee to establish liaison between and coordinate the activities of departments "in relation to actions and programs that may have effect on the preservation and development of historic sites" (Section 12 (2)). It also provides for the establishment of an Historic Sites Board that advises and makes recommendations to the Minister on matters concerning the preservation and protection of historic sites in Alberta (Section 13).

The Act gives the Minister power to, by order, designate any historic resource "the preservation of which he considers to be in the public interest" as a Registered Historic Resource, or a Provincial Historic Resource (Sections 15(1) and 16 (1)). He may also make regulations governing the standards of maintenance, signage and by order, require specific repairs and other measures to preserve any particular provincial historic resource (Section 19).

A Provincial Historic Area, containing historic resources of provincial significance, may be designated by Lieutenant Governor in Council. By regulation, land use and development may be controlled to maintain the overall integrity of character of an area. Municipal Historic Resources and Municipal Historic Areas may also be established.

The penalty for contravention of the Act is not greater than $50,000 or imprisonment for no more than one year.

Landals (1988:14) reports that the Alberta Historical Resources Act appears to have the teeth to protect Alberta's heritage and is equal to or better than other Canadian legislation.

Distribution and Natural Region Representation

More than 300 sites (the vast majority of which are privately owned) have been designated, including a few, small unique natural features in Alberta. These are listed in Table 4-20.

Although the department could have, it has not designated large areas because the Act is aimed primarily, although not exclusively, at historical resources—palaeontological, archaeological and historic periods (see Alberta Culture and Multiculturalism 1989).

Protection and Management

Signs identify designated historic resources, and altering or taking them is prohibited by law and penalties paid for contravention. Access to some of them is strictly controlled or prohibited. For some sites the department has provided interpretive materials and facilities.

Future Considerations

It is likely that two more sites of natural significance will be designated under the Historical Resources Act, both near Drumheller (Northern Fescue Grassland): a small petrified forest near Willow Creek and a hoodoo site. The department has a backlog of

Table 4-20
Designated Historic Resources of Natural Significance

Natural Region	Site Name and Description	Site Size (km^2)
Grassland		
Mixed	**Hetherington Erratic** (SE of Fort MacLeod)	0.58
	Devil's Coulee (near Raymond)	0.65
Northern Fescue	**Airdrie Erratic**	0.65
Parkland		
Foothills	**Douglas Fir Stand** (City of Calgary)	0.14
	Okotoks Erratics	0.65
Rocky Mountain		
Montane	**Frank Slide** (Crowsnest Pass)	1.44
	Ratsnest Cave (east of Canmore)	3.24
TOTAL AREA		**7.35**

SOURCE: Ward 1991: pers. comm.

about 900 sites recommended under the Designations Program, so there may be other sites of natural history focus (Hurt 1991: pers. comm.). The department would look to other government departments or natural history agencies to assist in the development or implementation of proper land management programs to protect these and other natural areas.

Alberta Municipal Affairs

The Department of Municipal Affairs provides regional and municipal planning services to municipalities not served by regional planning commissions. This includes assistance with land use plans, lake management plans, land use bylaws and subdivision approval. In this capacity and under the jurisdiction of the Planning Act, parcels of private land may be required to be set aside and protected as Environmental or Municipal Reserve. These areas can represent local natural areas that are loved and appreciated, and areas that provide for natural diversity in the landscape.

The purpose of the Planning Act is to provide a means whereby plans and related measures may be prepared and adopted to

(a) achieve the orderly, economical and beneficial development and use of land and patterns of human settlement, and

(b) maintain and improve the quality of the physical environment within which patterns of human settlement are situated in Alberta, without infringing on the rights of individuals except to the extent that is necessary for the greater public good (Section 2).

Under Section 98 of the Planning Act, the subdivision authority may require the registered owner of a parcel that is the subject of a proposed subdivision to provide part of that parcel as environmental reserve if it consists of

(a) a swamp, gully, ravine, coulee or natural drainage course,

(b) land that is subject to flooding or is, in the opinion of the subdivision authority, unstable, or

(c) a strip of land, not less than 6 m in width, abutting the bed and shore of any lake, river, stream or other body of water for the purpose of

  (i) preventing pollution, or
  (ii) providing public access to and beside the bed and shore.

Many of these factors are seen as constraints to the proper and appropriate development of the site. There is no required percentage of the land area that must be set aside as environmental reserve.

Section 111(1) states that: “Environmental reserve may be used as a public park but if it is not so used, it must be left in its natural state.”

Municipalities that adopt a “green policy”—that is more park, natural and open space— could, if they were the subdivision approving authority, require up to a specified percentage be set aside in each subdivision for protection.

Lake management plans have been developed for several Alberta lakes. As a result of the detailed assessment of a lake’s resources (including sensitive areas) lands could be designated for protection as Environmental Reserve (ER).

Environmentally Significant Area studies have been completed by most of the regional planning commissions and several individual municipalities, to help them make better informed land use decisions (Peddigrew 1991: pers. comm.).

Chapter 5

Federal Government and International Mechanisms

Federal Government Mechanisms

National Parks

The first legislated protection mechanism implemented in Alberta was the creation of Banff National Park in 1885, to protect the thermal springs at the Cave and Basin and elsewhere on Sulphur Mountain (Lothian 1981: 16). It was Canada's first national park. Now there are 34 national parks in Canada representing 21 of the 39 natural land regions of the country (see Figure A-1 in Appendix A, also Environment Canada 1990b).

In Alberta there are five national parks: Wood Buffalo, Jasper, Banff, Waterton and Elk Island. They represent three of the national parks natural regions, and 10 of the 17 natural subregions of Alberta (see Chapter 2). Their locations are shown in Figure 5-1. They are administered by the Canadian Parks Service of Environment Canada. There were eight national parks in Alberta, but by 1948 three had been closed (Pachal 1992).

The National Parks Act of 1930 states the broad purpose for national parks:

> *[t]he national parks of Canada are hereby dedicated to the people of Canada for their benefit, education and enjoyment ... and the national parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations (Section 4, 1930).*

Legislation and Government Administration

The Canadian Parks Service administers Canada's national parks under the jurisdiction of the National Parks Act and the 1988 Bill C-30, which extensively amends the Act. The Parks Canada Policy (Environment Canada 1983), which has no legislative authority, gives broad directions for the establishment and management of Canada's national parks. These three documents and National Parks Regulations contain the following notable legislative and/or policy features:

- The administration, management and control of the parks is under the direction of the Minister of the Environment (Bill C-30, 5.1).
- Provides authority to designate wilderness zones.
- Requires tabling of management plans for all parks and plan review every five years (Swinnerton 1991: 69).
- The ownership by the government of Canada of all land and resources within national parks (Environment Canada 1983: Section 3.7) (now under review).
- A high level of protection for the natural resources in the national parks to allow the natural environment to exist largely undisturbed by human activity (Environment Canada 1983: Section 3.1). To this end national parks "are protected by federal legislation from all forms of extractive resource use such as mining, forestry, agriculture, oil, gas and hydroelectric development and sport hunting (Environment Canada 1983: Section 3). Subsistence activities are permitted.
- Fines of up to $2,000 or imprisonment of six months for contravening the Act, except for poaching with fines of up to $200,000.

Management plans for Jasper and Banff national parks have recently been completed, while plans for the other three national parks in Alberta are being revised. These plans are guided by the principle that:

> *wherever conflicts occur between resource protection and increased use and development, protection will take precedence (Environment Canada 1988a).*

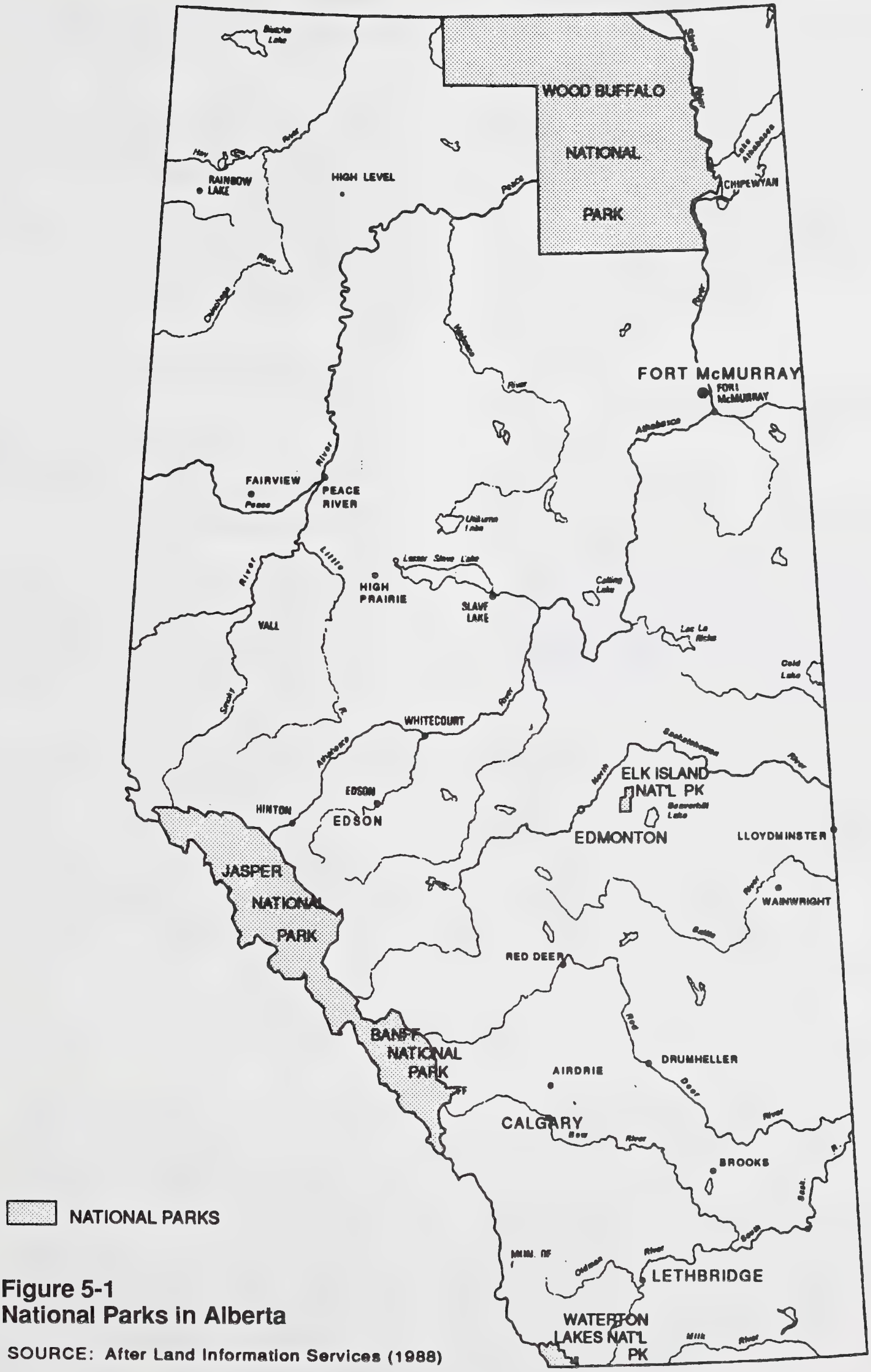


Figure 5-1
National Parks in Alberta

SOURCE: After Land Information Services (1988)

This is clearly stated in Section 5.1.2 of the amended Act (Pachal 1992). Visitor use is to be managed to safeguard natural and cultural resources as well as the aesthetics of each park. Visitor services will focus on providing opportunities associated with natural heritage resources rather than resort development. The Parks Service recognizes that a prerequisite for the continued use of the parks is the maintenance of their ecological and historical integrity. To achieve this, the greatest possible protection will be given to unique, sensitive, rare or endangered plant and animal species and to special habitats without which species would not survive.

Distribution and Natural Region Representation

The five national parks in Alberta cover 54,084 km^2, almost one-third of the total land area in Canada set aside for national parks (Lothian 1981) and 85% of Crown lands with protected status in Alberta (see Chapter 7 for further discussion). The last national park to be established in Alberta was Wood Buffalo National Park, in 1922. Banff and Jasper national parks have also been designated as part of the Rocky Mountain National Parks World Heritage Site (see later in this chaper).

Table 5-1 is a summary of the land areas affected, ecosystems represented and dates established.

Protection Provided for Designated Areas

The land in national parks is managed according to a zoning system that establishes the desired level of resource protection, use and development for specific areas. The Canadian Parks Service uses five different zones to "ease the tensions between use and preservation" (Environment Canada 1983: Section 2). These are used in the development of management plans for each park.

- Zone 1: Special Preservation - specific areas or features that deserve special preservation because they contain or support unique, rare or endangered features or the best examples of natural features. Access and use are strictly controlled or may be prohibited altogether. No motorized or man-made facilities are permitted.
- Zone 2: Wilderness - extensive areas that are good representations of each of the natural history themes of the park and which are maintained in a wilderness state. Only certain activities requiring limited primitive visitor facilities, appropriate to a

Table 5-1
Distribution of National Parks in Alberta, by Natural Region
(estimated area)

Natural Region	WATERTON LAKES (km^2)	BANFF (km^2)	JASPER (km^2)	ELK ISLAND (km^2)	WOOD BUFFALO (km^2)	TOTAL AREA (km^2)
Parkland						
Central						
Foothills						
Peace R.	50					50
Boreal Forest						
Subarctic					2,000	2,000
Hay R.					13,600	13,600
Peace R. Lowlands					20,215	20,215
Mixedwood				195	30	225
Rocky Mountain						
Montane	200	177				533
Subalpine/Alpine	275	6,464	10,878			17,461
ALBERTA TOTAL	**525**	**6,641**	**10,878**	**195**	**35,845**	**54,084**
Year established	1895	1885	1907	1913	1922	

SOURCE: based on personal communication with Wallis 1991; Pachal 1992; Landals 1991 and Morrison 1991.

wilderness experience, are allowed. Limits are placed on numbers of users. No motorized access is permitted. Management actions ensure that visitors are dispersed.

In recently completed plans for Banff and Jasper national parks (Environment Canada 1988a, b, c, d) the Canadian Parks Service has indicated that:

> *...all identified Zone 2 lands and appropriate Zone 1 lands within them will be recommended for Order-in-Council designation as wilderness areas...[this] will define these areas by regulation and prevent any level of development beyond that required for providing essential services and ensuring protection of park resources (Environment Canada 1988a).*

This has not yet happened, leaving 5.2% of the province designated as wilderness in Wood Buffalo National Park, and an additional 2.2% in the three more accessible Rocky Mountain national parks, without this level of protection (Pachal 1992).

The backcountry wilderness areas of the national parks are patrolled by wardens, usually on horseback, who monitor natural conditions and use levels, enforce use regulations, assist in emergency situations and advise on management measures needed (Kaiser 1991: pers. comm.; Van Tighem 1991: pers. comm.). These may include trail closures and restricted use of trails or areas by specific users (e.g., mountain bikers, hang gliders). There are a few warden cabins located in the backcountry areas.

- Zone 3: Natural Environment - areas that are maintained as natural environments and which can sustain, with a minimum of impairment, a selected range of low-density outdoor activities with a minimum of related facilities. Nonmotorized access is preferred, although access by public transit is permitted. Controlled access by private vehicles is only permitted where it has traditionally been allowed.
- Zone 4: Outdoor Recreation - limited access that can accommodate a broad range of education, outdoor recreation opportunities and related facilities in ways compatible with the natural landscape. Motorized access is permitted and may be separated from nonmotorized access.
- Zone 5: Park Services - towns and visitor centres in certain national parks that contain a concentration of visitor services and support facilities as well as park administration functions. Motorized access is permitted.

Another mechanism used by the national parks to provide additional protection is the designation of Environmentally Sensitive Sites (ESS). Unlike Zone 1 areas, these are sites that can accommodate relatively high levels of controlled visitor use without jeopardizing the resource.

Areas in the national parks may be assigned other federal or international designations. An example is the section of the Athabasca River in Jasper National Park that is designated a Canadian Heritage River .

Waterton Lakes National Park

Waterton Lakes National Park, "the little gem in the Rockies" covering an area of 525 km², features unique geological features and an abundance and diversity of flora and fauna. This is due in part to the variety of natural ecosystems found within the park: parkland, prairie and mountain areas. Because of the open nature of the landscape many species are seen by the almost 360,000 visitors to the park every year.

The management plan for Waterton Lakes National Park is being revised, with public participation and input (Tilson 1991: pers. comm., Environment Canada 1990b, 1990c). Most of the area is managed as wilderness (Zone 2)—the extent of this zoning will be delineated in the revised management plan. More than one-third of all the visitors to the park use the 140-km trail system. This includes an average of 2,000 campers who make use of the 12 backcountry campsites and a few shelters. The provision of backcountry opportunities in Waterton Lakes National Park, as in the other mountain parks, emphasizes the retention of large, trail-less areas. Expansion and upgrading of existing facilities is favoured over new development, and in some cases, some facilities may be removed from the backcountry. Old roads and disturbed areas are being rehabilitated to natural conditions. About 5% of the Montane portion of the park is affected by an existing road network (Wallis 1991: pers. comm.).

There are several natural resource management issues facing Waterton Lakes park administrators. Until 1989 all fires in the park's wildlands were suppressed. Prescribed burning to simulate natural processes is now undertaken. The control and protection of an international herd of elk is also the responsibility of park managers, who cooperate with provincial wildlife managers since these animals migrate outside the park onto lands where they are hunted. Managing bears is also an issue, as it is in other mountain parks (Tilson 1991: pers. comm.).

Development is concentrated in the Waterton

Lakes townsite and along a couple of narrow corridors (e.g., Redrock Canyon and Cameron Lake). Public access is prohibited in only one site, the buffalo enclosure. But there are a number of unmarked "critical sites," including sites that support rare, endangered plants and archaeological sites. The main highway in the park is currently being redeveloped. All new projects must undergo an environmental review process (Tilson 1991: pers. comm.).

Banff National Park

Banff and Jasper national parks are two of the four mountain parks designated in 1985 by UNESCO as part of a World Heritage Site, in recognition of their outstanding natural beauty and wilderness character, diversity of vegetation and wildlife (including examples of unique, rare or endangered species), and the exceptional examples of natural processes (such as glaciation, canyon formation and karst features) occurring in the Rocky Mountains (Environment Canada, 1988b).

It is the Canadian Parks Service's objective to protect and preserve these natural resources and processes, as well as nationally significant cultural resources that illustrate human interaction with nature. It is also the Parks Service's intention to provide year-round opportunities for people to appreciate and enjoy these resources while maintaining the wilderness character of the park areas.

Cumulative development in Banff National Park over the past 100 years makes it an unusual national park because it has a lower proportion of wilderness than other parks. Only 93% (compared to 98% for Jasper National Park) is managed to provide backcountry opportunities and to protect the natural ecosystems it encompasses (Environment Canada 1988a). The park management plan, completed in 1988, has as its guiding principles the protection and preservation of natural and cultural features, especially:

- The montane areas of the lower Bow Valley (which contain significant vegetation types such as grasslands, Douglas Fir, aspen and white spruce forest communities).
- The karst features of the Castleguard Caves; the Sulphur Mountain thermal springs (the original reason for the designation of Banff National Park).
- The woodland caribou, grizzly bear, wolf, cougar and predatory bird populations.

Expansion and upgrading of existing facilities in already disturbed areas is favoured. The existing road system affects at least 10% of the Montane portion of the park and 5% of the Alpine/Subalpine areas (Wallis 1991: pers. comm.). The repair of existing environmental disturbances is a priority. Reducing the stress on wildlife caused by the Trans Canada Highway, CP Rail and the park's own roads is also a park management objective.

Banff National Park's area is 6,641 km^2. However, since it was created in 1885, its boundary has been altered 10 times (Bailey 1990: 6).

Four percent of Banff National Park is designated Zone 1, Special Preservation, found in four separate areas: (1) the Clearwater-Siffleur area containing the range of Alberta's southernmost woodland caribou herd (see also discussion of wilderness areas), hoodoos, permafrost areas, rare plant and animal species, prehistoric cultural sites, elk and bighorn sheep ranges, and wolf and grizzly bear habitat; (2) the Castleguard Cave system and meadows; (3) the Cave and Basin Marsh; and (4) the Christensen archaeological site. Separate management strategies will be developed for each of these Zone 1 sites.

Zone 2, Wilderness, comprises 93% of the park area. The backcountry is used by 20,000 people each year, hiking the more than 1,500 km of trails and using three shelters, seven alpine huts, four commercial lodges and cabins and a variety of group campsites. For these areas there is no motorized access and limits on the number of users may be imposed. Development is restricted to designated trails, campgrounds and primitive shelters with a few exceptions (for basic activities, and facilities related to park administration, resource management and public safety). Zone 2 areas within Banff National Park will be recommended for Order-in-Council designation as wilderness areas.

Less than 1% of the park is classified as Zone 3, Natural Environment. There are numerous examples of sites, for example, Johnson's Canyon, that have been developed for public enjoyment.

Less than 1% is found in Zone 4, Outdoor Recreation. These areas include the Trans Canada Highway right-of-way, and areas at Lake Minnewanka, Moraine Lake and the Mount Norquay, Lake Louise and Sunshine Village ski areas. The town of Banff (now an independent centre) and Lake Louise Visitor Centre are the only areas in Zone 5, Park Services.

There are two Environmentally Sensitive Sites in Banff National Park: the Vermilion Lakes wetlands and the Middle Springs at Sulphur Mountain. Specific management plans will be developed for each area.

Jasper National Park

Jasper National Park, covering 10,878 km², is the largest of the four mountain parks, protecting a representative portion of the eastern Rocky Mountains, extending from the continental divide to the foothills. It contains the major vegetation zones representative of the Rocky Mountain front and main ranges with variations due to precipitation, altitude and latitude. Extensive stands of lodgepole pine are present as are other boreal species such as spruce and tamarack. The extensive montane areas are very important for ungulates such as mountain caribou, mountain goats and bighorn sheep. Large undisturbed tracts of land in this park provide diverse and uninterrupted habitat for these and other Rocky Mountain species such as grizzly bears and wolves.

From a geographical point of view, Jasper National Park is a goldmine. It contains examples of many different mountain landscape features and processes: karst features such as canyons, underground rivers, kettles; exposed reef formations; landscape features associated with rivers and glaciers; hot and cold mineral springs. The headwaters of many major rivers, including the Athabasca River, are found in this park.

A park management plan was completed in 1988 (see Environment Canada 1988b, 1988c). Less than 1% of the park is managed as Zone 1, Special Preservation. Four sites are identified in this category: an ancient and isolated forest of Engelmann spruce; Surprise Valley with special karst features; the Devona Archaeological Site and the Jasper House Historic Site. Each of these sites will be studied to determine their significance and environmental sensitivity, and to develop a management plan to ensure their preservation.

About 98% of Jasper National Park is managed as wilderness; extensive areas representing the natural history of the park. Much of the Zone 2 land is steep mountain slopes, glaciers and lakes, which cannot accommodate high levels of visitor use and facility development. For these areas there is no motorized access and limits on the number of users may be imposed. Development is restricted to designated trails, campgrounds and primitive shelters with a few exceptions (for basic activities, and facilities related to park administration, resource management and public safety). The more than 1,000 km of maintained backcountry trails, 100 backcountry camping sites, seven roofed facilities and large areas without trails are used by an estimated 9,000 visitors each year.

> *Large areas will continue to be left free of man-made facilities so that visitors will have a chance to experience a sense of freedom, solitude and challenge. In these areas random camping is allowed (Environment Canada 1988c).*

All existing backcountry roads in Zone 2 will remain closed and left to revegetate naturally or be rehabilitated. Zone 2 areas in Jasper National Park will be recommended for Order-in-Council designation as wilderness areas (see previous section regarding Zone 2 designation).

Less than 1% of Jasper National Park is classified as Zone 3, Natural Environment, the transition between wilderness and outdoor recreation areas that accommodates low density outdoor recreation activities and modest visitor facilities such as backcountry lodges. Nonmotorized access is preferred. Some of the Zone 3 areas are: Tonquin Valley, Maligne Lake area, Pyramid Bench, the Athabasca River, the area between Highway 16 and Celestine Lake Road, and the portion of the Columbia Icefield serviced by commercial snow coaches. Boats with electric motors are allowed on lakes in this zone.

Zone 4 areas comprise less than 1% of the park's area. This includes the public road right-of-ways and recreational facilities and services accessible by motorized vehicles. Examples of these areas are the Miette Hot Springs, Snaring River campground and overflow, Maligne Canyon and Maligne Lake day use area, and Marmot Basin ski area. Boats with electric motors are allowed on lakes in this zone.

The only area in Jasper National Park that is Zone 5 is the Jasper townsite, which represents less than 1% of the park area.

In Jasper National Park there are two Environmentally Sensitive Sites: Edith Cavell Meadows and Pocahontas Ponds. A resource and visitor management plan will be drawn up for each of these areas, reflecting the high priority placed on their protection. The section of the Athabasca River found in Jasper National Park is designated as a Canadian Heritage River in recognition of its outstanding natural, human heritage and recreational values. The management plan indicates that the recreational opportunities associated with this river and others in the park will be enhanced. Power boating is not permitted on any of the park's rivers.

Throughout the park, rehabilitation of already disturbed park lands is a priority.

The success of fire suppression programs has adversely altered the ecological balance in Jasper

National Park. To address this issue, the Canadian Parks Service has adopted a new policy regarding the use of fire:

> *...will use fire as a tool to maintain the stability and diversity of ecosystems, while still protecting park facilities and neighbouring lands from wildfires (Environment Canada 1988c).*

The parks service will also take appropriate actions to ensure that representative wildlife populations and their important habitats are maintained in the park, particularly sensitive species such as grizzly bear, caribou, wolves, cougar and raptors. These actions may involve seasonally or temporarily closing habitat areas to visitor use. The parks service will coordinate their activities with the provincial wildlife agencies for species that migrate across the park boundaries. Sport fishing will be managed to ensure the protection of aquatic ecosystems and viability of native fish populations (Environment Canada 1988c).

Elk Island National Park

Elk Island National Park, Alberta's smallest national park is located about 40 km east of Edmonton in the forested moraineland of the Beaver Hills. The 195-km^2 park is in a transition zone, being a combination of the aspen forests and grasslands of the Central Parkland Natural Region; more than 200 shallow ponds, bogs and lakes; and mixedwood forests of white spruce, white birch and aspen, more typical of the Mixedwood Boreal Forest Natural Region. It is Canada's only fenced national park and is surrounded by deforested, marginal farmland.

Elk Island National Park began as a game preserve for elk in 1907, when five local men, concerned about the alarming loss of wildlife as the area was converted to farmland, petitioned the federal government to establish a fenced elk sanctuary. Colonization had already extirpated several mammals, including wolf, bear, cougar, otter, marten and beaver, and reduced moose, elk and mule deer to extreme scarcity.

When the game preserve was created in 1907, it supported 24 elk and 25 mule deer, a few moose and a variety of small mammals. In the same year, 400 plains bison, destined for a newly created national park at Wainwright (which was later ceded to the Armed Forces in 1947) were temporarily held in the elk preserve and all but 50, who could not be rounded up, were subsequently transferred to Wainwright. The 50 remaining were the ancestors of today's herd of 400, which roams the northern part of the park. A separate herd of 250 wood bison lives in the southern one-third of the park, separated from the rest by Highway 16.

Today there are also about 400 moose, 500 deer and more than 1,500 elk in the park. Beavers thrive and there is a variety of wildlife: 33 species of mammals, 217 of birds, four amphibian and four fish species and many smaller creatures have been recorded (Griffiths 1979).

Because of its close proximity to Edmonton and other centres in central Alberta, Elk Island is a popular weekend park—about 51% of the more than 300,000 visitors annually, use it on Saturdays or Sundays. About half of all visitors go to the recreation area in the northern part of the park where there is an 80-site campground, nonmotorized boating lake, nine-hole golf course and concessions. The park has more than 100 km of hiking/snowshoeing/cross-country skiing trails.

There are no areas closed to the public in Elk Island National Park. The southern part of the park, until recently reserved for the wood bison herd, has been "opened up" with the construction of a 18.6-km loop trail and parking lot and washrooms at the trail head. This trail provides access to only about half the area. Because of the length of the trail and its isolation from other park facilities, only 2 to 3% of visitors come to that part of the park (Kaleski 1991: pers. comm.).

Fire is used as a habitat management technique to maintain and improve the browsing habitat for the many ungulates in the park. Live-trapping and transferring of elk to other parts of the province is under way to reduce their numbers in Elk Island National Park (Kaleski 1991: pers. comm.).

The 1978 management plan for Elk Island National Park is under review . A public participation program was initiated in early 1990 and a new plan is to be completed in 1992 (Kaleski 1991: pers. comm.).

Wood Buffalo National Park

Wood Buffalo National Park in the northeastern part of Alberta is the largest national park in Canada, encompassing about 44,500 km^2 of land and water in the Northern Boreal Plains and Southern Boreal Plains and Plateaux (Parks Canada Natural Areas, see Appendix A) and all four Boreal Forest natural subregions (see Figure 2-1). The Alberta portion of the park covers about 35,845 km^2. The park is characterized by boreal forests of jackpine and spruce, interspersed with large areas of muskeg and plains and prairies. The park contains about 80% of the world-famous Peace-Athabasca Delta, an extensive freshwater delta and system of perched basins at the west end of Lake Athabasca. The area is the habitat for millions of waterfowl, aquatic mammals, bison and other large mammals.

Unique to Wood Buffalo National Park are the nesting grounds for the endangered whooping crane (once on the brink of extinction), the largest free-roaming herd of bison, the largest gypsum karst landscape in the world, one of the last natural populations of peregrine falcons in the southern boreal plains, pelicans, moose, deer and some caribou, and one of the highest densities of wolves in North America.

The 1984 management plan for Wood Buffalo National Park is being revised and a new one is expected to be completed in 1991 (Mercer 1991: pers. comm.). About 90% of the park is classified as Zone 1, Special Preservation. There are nine Zone 1 areas including the whooping crane nesting areas (public access strictly prohibited April to November), two caribou spruce-lichen habitat areas, peregrine falcon nesting sites, two major bison calving areas and representations of karst environments. Access to several of these areas is difficult, even by boat.

Native hunters and trappers harvest in the park, particularly in the Peace-Athabasca Delta. About 6,000 visitors come to the park each year, mostly in recreational vehicles. There is a 37-site campground and a day use area. There are a few trails in the park and only a handful of designated backcountry campsites (Mercer 1990: pers. comm.).

Wood Buffalo National Park is exceptional because it is the only national park that has commercial timber harvesting. A 487-km² timber berth contains significant stands of old growth boreal forest. Wallis (1991: pers. comm.) estimates that up to 5% of the park's area has been affected by forestry.

In January 1992 the Canadian Parks and Wilderness Society (CPAWS), initiated a legal action to end logging in Wood Buffalo National Park. CPAWS alleged that the federal government violated the trust obligation with Canadians to protect national parks in an unimpaired state for future generations. In May 1992, the federal government agreed with CPAWS that the logging lease is illegal in a national park.

The park experiences a high incidence of fire, about 40 each year. Because of the large area of the park, many of these are allowed to burn. In 1980-81, about 8-10,000 km², almost 25% of the park, burned. In recent years park managers have been working with prescribed burning rather than just controlling wildfires (Mercer 1991: pers. comm.).

A major concern of park managers is the apparent long-term deterioration of the Peace-Athabasca Delta. Large parts of the upper delta (perched basins) are drying up, thus reducing the habitat for millions of waterfowl and aquatic mammals such as muskrat, as well as for bison. This deterioration is linked to the changes in the flow regime of the Peace River caused by the construction of the W. A. C. Bennett Dam upstream in British Columbia. Back-flooding of waters from the Peace River into the Peace-Athabasca Delta has been severely reduced or eliminated (Mercer 1991: pers. comm.)

Future Considerations

All national parks in Alberta enjoy full national park status. (There are a few areas in Canada, called National Park Reserves, that are administered as national parks but because of some legal hindrance have not achieved full national park status.) The Canadian Parks Service has no plans to establish more national parks in Alberta. Establishing a national park is a complicated process, involving feasibility studies between federal and provincial/territorial governments, the resolution of land use conflicts and public involvement (Environment Canada 1990b).

Negotiations are ongoing to transfer highway corridors (including development nodes, wide road corridors or right-of-ways) to the Alberta government (Van Tighem 1991: pers. comm.). The integrity of national parks is also being threatened by provincially dictated and approved policies and activities such as pulp mills on the Athabasca and Peace rivers and predator control along the Eastern Slopes.

Migratory Bird Sanctuaries

Most protection mechanisms outlined in this chapter were established to protect specific geographical areas. Migratory Bird Sanctuaries are an exception. They are intended to protect migratory birds by setting aside specific sites where they can safely breed, nest and stage. In 1917 the Migratory Birds Convention Act was signed by Canada and the United States. This Act, and subsequent sanctuary regulations passed in 1954, makes provisions for the establishment of migratory bird sanctuaries. There are now 82 migratory bird sanctuaries in Canada, four of which are located in Alberta (Vontobel 1982).

The sanctuary regulations under the Migratory Birds Convention Act identify a uniform system of protection for migratory game and nongame bird species by establishing special refuges and continuously closed seasons for birds in these areas.

Legislation and Government Administration

The Canadian Wildlife Service, a branch of Environment Canada, administers this program in accordance with the Migratory Birds Convention Act and its Migratory Bird Sanctuary Regulations.

According to the Migratory Bird Sanctuary Regulations:

> No person shall, in a migratory bird sanctuary,
>
> (a) hunt migratory birds,
>
> (b) disturb, destroy or take the nests of migratory birds, or
>
> (c) have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird, except under authority of a permit therefore (Sec. 3.2).

The Minister of Environment may cancel any permit that has been issued to any person, if, in his opinion, that person has failed to comply with the conditions set out in the permit or the activities being carried on by that person are likely to be harmful to migratory birds or the eggs, nest or habitat of migratory birds within a migratory bird sanctuary (Sec. 9.3). If activities injurious to the birds occur, the Department of Environment may prosecute offenders.

The regulations provide for the protection of the migratory birds but do not contain anything specific pertaining to habitat protection measures. Under the Migratory Bird Regulations Section 6(a) general prohibitions are stated.

Under the Canada Wildlife Act the Governor in Council may authorize the Minister to purchase, acquire or lease any lands or interests therein for the purpose of research, conservation and interpretation in respect of migratory birds (Sec. 10.1). The consent of the landowner is required to designate and maintain a migratory bird sanctuary on his/her land.

Distribution and Natural Region Representation

There are 82 migratory bird sanctuaries in Canada, covering 112,600 km^2, ranging in size from less than 1 km^2 to 62,800 km^2. There are four migratory bird sanctuaries (MBS) in Alberta, covering 141.50 km^2 (Environment Canada 1985). These are listed by natural region in Table 5-2. Three are found in the Parkland region, each representing a different subregion. The fourth, which covers almost 90% of the total area covered by MBS in Alberta, is found in the Peace River Lowlands of the Boreal Forest Natural Region.

Protection and Management

There are no active protection measures in migratory bird sanctuaries in Alberta. The ecological integrity of the three southern MBSs in Alberta has declined. The public influx into the two city sanctuaries (Inglewood in Calgary and Red Deer in Red Deer) has led to substantial degradation of habitat and reduction in numbers of birds nesting in these two areas. More than 20,000 people, for example, visit the Inglewood sanctuary every year, including many school groups. On several occasions, Canadian Wildlife Service staff have recommended delisting these two sanctuaries, but this is not being pursued (Coleman 1991: pers. comm.). They are considered more valuable for the indirect contribution they make to migratory bird conservation: by providing an easily accessible opportunity for the public, especially children, to learn about migratory birds and their habitats.

The trumpeter swan nesting sites in the Saskatoon Lake MBS are disturbed by recreationists and berry-pickers (Environment Canada 1985). The value of the Richardson Lake MBS requires reevaluation in light of the declining water levels in the Peace-Athabasca delta.

Future Considerations

Migratory bird sanctuaries are one of several mechanisms available to provide for the protection and conservation of an international resource: migratory birds. No new areas are proposed, although this may change under the federal Green Plan (Coleman 1991: pers. comm.). The need and ways to protect the continent's waterfowl breeding habitat are being assessed by federal and provincial government agencies in cooperation with the private sector under the North American Waterfowl Plan.

Table 5-2
Distribution of Migratory Bird Sanctuaries in Alberta, by Natural Region

Natural Region	AREA (km²)	SANCTUARY NAME, LOCATION & LAND OWNERSHIP
Parkland		
Central	1.3	Red Deer MBS - City of Red Deer - city and private land
Foothills	1.6	Inglewood MBS - City of Calgary - city and private land
Peace R.	11.35	Saskatoon Lake MBS - northwest of Grande Prairie - provincial Crown land - four separate parcels containing trumpeter swan habitat
Boreal Forest		
Peace R. Lowlands	127.25	Richardson Lake MBS - Peace-Athabasca Delta area - provincial Crown land
ALBERTA TOTAL	**141.5**	

National Wildlife Areas

The federal government's 1966 National Wildlife Policy (Government of Canada 1966) stated that every effort would be taken to preserve Canadian wildlife species from extinction. To help realize this goal, the National Wildlife Area Program was initiated in the same year. The purpose of national wildlife areas is to preserve and maintain important or unique lands for wildlife (Environment Canada 1985). National Wildlife Areas (NWA) share some of the same aims as the migratory bird sanctuaries, except that the former are all-encompassing in their protection of wildlife (Vontobel 1982: 25). There are three national wildlife areas in Alberta.

Legislation and Government Administration

The Canadian Wildlife Service administers these wildlife areas in accordance with the Canada Wildlife Act and the Wildlife Area regulations. This Act provides for the establishment of NWAs and enables the Minister to acquire land for research, conservation and interpretation. The regulations associated with the Act prohibit all types of activities that are damaging to wildlife using the site and to the habitat at the site.

Under the Act, the Canadian Wildlife Service (CWS), in cooperation with the province, can acquire and purchase lands for the protection of wildlife. The CWS draws up a management plan for each area that states which activities will be compatible with the conservation of wildlife there.

> *Each NWA is managed individually to preserve or increase that area's value to wildlife (Environment Canada 1985: 1).*

Possible permitted activities are the construction of dams, the planting of lure crops and the grazing of cattle, as well as a number of nonconsumptive recreational activities such as bird-watching, hiking and canoeing.

Public notification of the NWA is required—the advertisement will outline which activities are allowed without a permit (for example, picnicking). Permits must be obtained for all other activities conducted in the area. The Minister of Environment may cancel, amend or suspend a permit if the conservation of wildlife is endangered. Use restrictions may be changed by the CWS to correspond to changes in management of the site.

Distribution and Natural Region Representation

The three national wildlife areas were lands formerly held by the federal government and deemed "surplus." Canadian Wildlife Service evaluated these lands and recommended that they be declared NWAs because of their importance to wildlife in the area where they are located.

Protection and Management

All NWAs had already been used for a variety of activities before they were designated. Blue Quills NWA is on former Indian school land with wetlands, tree cover and some farmland. There are waterfowl nesting areas. A self-guided nature trail is used by local school groups (Coleman 1991: pers. comm.; Goodman 1991: pers. comm.).

Spiers Lake was formerly native pasture. There are goose nesting structures and protection is provided for Piping Plover habitat. Meanook NWA is on former federal Department of Energy and Mines land and, under a licence of occupation, is now used by the University of Alberta as a field research station (Goodman 1991: pers. comm.).

All NWAs are fenced, signed and regularly inspected.

Future Considerations

In March 1992 the federal government announced plans to designate a 400-km² NWA in the Suffield Military Reserve located in the Mixed Grassland subregion.

The need to protect additional habitat areas is being assessed by federal and provincial government agencies in cooperation with the private sector under the North American Waterfowl Plan and other federal-provincial programs.

Table 5-3
Distribution of National Wildlife Areas in Alberta, by Natural Region

Natural Region	AREA (km²)	NATIONAL WILDLIFE AREA & LOCATION
Parkland		
Central	0.64	Spiers Lake - near Hanna
Boreal Forest		
Mixedwood	0.98	Blue Quills - near St. Paul
	2.14	Meanook - near Athabasca
ALBERTA TOTAL	3.76	

Canadian Heritage Rivers

The Canadian Heritage Rivers System (CHRS) arose from a formal recommendation by the Hon. J. Hugh Faulkner, then Minister responsible for Parks Canada, to provincial and territorial ministers at the 1978 Federal -Provincial Parks Conference. He proposed that a task force be established to formulate objectives and guidelines for the management and recognition of nationally significant rivers. This task force (which included representatives from Alberta) presented their final report in 1981 and received majority agreement among the federal, provincial and territorial governments by 1983. The following year, the CHRS was established under the supervision of the Canadian Heritage Rivers Board. Alberta and British Columbia are the only two provinces not participating on the board. In Alberta, however, the federal government has used its jurisdictional powers to designate a portion of the Athabasca River in Jasper National Park and a portion of the North Saskatchewan River in Banff National Park (Environment Canada 1990a).

The purpose of the Canadian Heritage Rivers System is to give national recognition to the important rivers of Canada and to ensure their future management such that:

- The natural heritage and human heritage which they represent is conserved and interpreted.
- The opportunities they possess for recreation and heritage appreciation are realized by residents of, and visitors to Canada (Environment Canada 1983).

Legislation and Government Administration

The CHRS is administered by the Canadian Parks Service under the authority of the National Parks Act (Pachal 1992). It is a joint venture between federal, provincial and territorial agencies. Representatives from these various levels of government sit on the primary supervising body, the Canadian Heritage Rivers Board. This board operates according to certain principles that help govern the process for designating and managing a particular river. Because these principles do not have any legislative power, compliance generally depends on the honour system.

A Canadian Heritage River does not necessarily include the entire length of the river in question. A river, according to the CHRS definition, is

> *...the entire length or a segment of a river and its immediate environment and includes the lakes, ponds, estuaries or other bodies of water through which it flows (Environment Canada 1983).*

Notable principles and guidelines that outline the responsibilities of managing the designated rivers (Environment Canada 1983) are:

- The system will be a cooperative one in which federal, provincial and territorial governments, in participating in the establishment and administration of the system, retain their traditional jurisdictional powers, including ownership of land, the choice to nominate a river to the system and the right to continue to operate and manage designated rivers in accordance with the objectives of the system.
- Parks Canada will participate in and encourage the establishment, growth and public awareness of the Canadian Heritage Rivers System. Parks Canada may also financially assist nominating agencies to carry out studies and prepare plans related to the nomination and/or management of rivers proposed for inclusion in the system.
- The management of Canadian heritage rivers by the agencies concerned will address the conservation and interpretation of natural and human heritage and the realization of recreational opportunities in keeping with the objectives of the system.
- Regional governments may, at any time, remove the designation of a heritage river within their jurisdiction.

Distribution and Natural Region Representation

As of June 1990, more than 4,000 km of 18 rivers in Canada had been nominated for the system (Environment Canada 1990a). Nine of these nominations achieved designated status.

In Alberta, a 168-km segment of the Athabasca River in Jasper National Park, and 48.5 km of the North Saskatchewan in Banff National Park have Canadian Heritage River status (see Environment Canada n.d.). Because federal jurisdictional power does not extend beyond the national park boundaries, the entire length of these rivers could not be nominated for the system by Parks Canada.

Protection and Management

Activities on heritage rivers in Canada must contribute to their long-term conservation and interpretation. The CHRS has strict standards relating to the water quality of the rivers included in the system—these standards provide some protection for the river. Public support for the concept acts as an incentive for the regional governments participating in the program to maintain the integrity of its heritage rivers.

With the exception of headwater segments of two major rivers found in Banff and Jasper national parks, Alberta retains jurisdiction over river management. Swinnerton (1991: 42-43) reports that although the importance of designating waterways and land corridors for protection and recreation has been acknowledged by several Alberta government agencies, few steps have been taken.

Future Considerations

In March 1992 Alberta Environment Minister Ralph Klein announced that he would carry forward a recommendation that the Government of Alberta participate in the Canadian Heritage Rivers Program. The Alberta Wilderness Association (AWA) lists 10 rivers that should be protected as "wild rivers" (Pachal 1992). Pachal (1992) estimated that there are only 1,608 km of river in Alberta that would qualify for protection under this legislation.

Cooperative Heritage Sites

Cooperative Heritage Areas are the product of Agreements for Recreation and Conservation reached between the federal and provincial governments as well as other organizations and individuals to establish and administer Cooperative Heritage Areas relating to waterways and surrounding areas. These are significant natural and/or culture heritage areas that demonstrate "a substantial physical, economic and social impact on the region" (Environment Canada 1983: 39). Incorporated into these agreements is a former program called Byways and Special Places, which was designed to protect nationally significant water routes.

The Parks Canada Objective for Agreements for Recreation and Conservation and, by implication, for cooperative heritage areas (Environment Canada 1983: 40) is:

> *To protect significant natural and cultural resources within certain heritage areas and to encourage public use, understanding and recreational enjoyment of such areas by acting in conjunction with other governments, organizations and individuals through agreements for recreation and conservation.*

Legislation and Government Administration

Agreements for Recreation and Conservation constitute the framework for the protection of cooperative heritage areas. These agreements "commit participating agencies to joint action in a process that involves research, planning, negotiation, development and management" (Environment Canada 1983: 42). However, like policy statements, these agreements have no legislative authority. While each agreement is unique, they all share certain general characteristics:

- The agreement will clearly state the objectives and responsibilities of the participants (Environment Canada 1983: Section 2.1).
- Natural and/or cultural heritage resources will be given appropriate protection by the participant who is responsible under the joint agreement (Environment Canada 1983: Section 3.1).
- Depending on the nature of the cooperative heritage area, a wide range of uses and recreational activities will be encouraged to meet the objectives of the participants as stated in the joint agreement (Environment Canada 1983: Section 4.2).
- Parks Canada contributes to those information and interpretation programs, recreational activities, facilities and services which foster an appreciation and understanding of the heritage resources (Environment Canada 1983: Section 4.1).

Distribution and Natural Region Representation

There are three cooperative heritage areas in Canada, (none in Alberta): the corridor surrounding the Rideau and Trent-Severn canals, the Red River Corridor and part of the Mackenzie River waterway (Environment Canada 1983: 39).

Future Considerations

Alberta has not entered into such an agreement, nor are there any plans to do so.

International Protection Mechanisms

World Heritage Sites

In 1972, the member states of the United Nations (UNESCO) unanimously adopted the World Heritage Convention, concerning the protection of the world cultural and natural heritage, "...to ensure the identification, protection, presentation and interpretation of the world's most significant cultural and natural heritage" (Landals 1988: 7). Canada adhered to the convention in 1976.

The convention provides for

> *compilation of a World Heritage List to include those cultural and natural properties throughout the world which are considered to be of outstanding universal value according to criteria drawn up by the World Heritage Committee (Environment Canada 1988: 1).*

The areas nominated for their outstanding natural characteristics and integrity should:

(a) be outstanding examples representing the major stages of the earth's evolutionary history; or

(b) be outstanding examples representing ongoing geological processes, biological evolution and man's interaction with his natural environment; or

(c) contain superlative natural phenomena, formations or features or areas of exceptional natural beauty; or

(d) contain the foremost natural habitats where threatened species of animals or plants of outstanding universal value still survive (Environment Canada 1988 :1).

Legislation and Government Administration

The Canadian Parks Service of Environment Canada is the main federal agency involved with the World Heritage Sites Program. This department played a role in both drafting and implementing the World Heritage Convention. Other governments and departments can nominate sites.

Distribution and Natural Region Representation

In Alberta there are four World Heritage Sites:

1. Head-Smashed-In Buffalo Jump Provincial Historic Site, declared in 1981, is a 40-km² area containing the oldest, largest and best-preserved bison jump in North America, located 19 km west of Fort MacLeod in the Porcupine Hills (Mixed Grassland subregion).
2. Dinosaur Provincial Park, declared in 1979 is a 66-km² badlands area along 24 km of the Red Deer River that contains an unparallelled abundance of Upper Cretaceous dinosaur fossils (Mixed Grassland subregion of southeastern Alberta).
3. Wood Buffalo National Park, located on the Alberta-North West Territories border. This park is under consideration as a threatened World Heritage Site because of logging and deterioration of the Peace-Athabasca Delta.
4. Rocky Mountain national parks, which includes Banff, Jasper, Yoho and Kootenay parks. The Burgess Shales site in Yoho is a subsite.

Protection and Management

As world heritage sites are not formally restricted by federal or provincial legislation, there are no set land use guidelines for them. The four sites in Alberta are already protected under other provincial or national designations. Designation as a world heritage site does, however, offer some additional degree of protection because of the high profile and international value placed on the site's natural integrity and protection.

By agreeing to the two provincial sites being added to the list of world heritage sites, Alberta has made a commitment to the world to maintain the integrity of the sites, preserve the fossils and artifacts discovered there and present education and interpretive programs to world citizens (Landals 1988:7).

Future Considerations

There are no nominated world heritage sites in Alberta. An application to adjust the boundaries of Dinosaur Provincial Park will be made by Alberta Tourism, Parks and Recreation to UNESCO to increase the size of the park, by deleting benchlands that have no paleontological or other heritage resource value but which have other resource value (e.g., oil and gas), and adding riparian and other areas with high heritage resource value (Ward 1991: pers. comm.). Waterton Lakes National Park has been nominated by American and Canadian groups.

Ramsar Sites

In 1971, Canada and 17 other countries signed the Convention on the Conservation of Wetlands of International Importance in Ramsar, Iran.

Under the Ramsar Convention, countries identify and secure designation of wetland sites of international importance to ensure they are protected now and in the future. The International Union for the Conservation of Nature and Natural Resources (IUCN), based in Gland, Switzerland, and the Wetlands Research Bureau (WRB), based in Slimbridge, England, have been instrumental in supporting the development and implementation of the Ramsar Convention (see Environment Canada 1987).

Legislation and Government Administration

The designation of a Ramsar site does not override national or provincial legislation to protect wetlands. Rather it supports that legislation by drawing international attention to threats of deterioration or damage to those areas listed.

The Canadian Wildlife Service of Environment Canada carries out the obligations of the Ramsar Convention for Canada. Sites are selected according to a number of criteria:

- The wetland is a particularly good example of a specific type of wetland characteristic of its region, be it rare or common,
- The wetland supports plants or animals that are rare, vulnerable or endangered, is important in maintaining the genetic and ecological diversity of a region; is a habitat important to species at a critical stage of their life cycle; or is of special value to endemic species or communities, or
- The wetland regularly supports 20,000 waterfowl (e.g., loons, grebes, pelicans, storks, ibises, spoonbills, herons, flamingos, swans, geese, ducks, cranes, rails, coots, shorebirds, gulls, terns);

regularly supports 1% of a waterfowl population; or supports substantial numbers of waterfowl indicative of wetland values, productivity or diversity (Poston and Hyslop 1987).

Distribution and Natural Region Representation

By 1987, 28 wetland areas in Canada had been designated as Ramsar sites, including six national wildlife areas and three migratory bird sanctuaries. There are four in Alberta, listed in Table 5-4.

Protection and Management

Ramsar sites in Canada may be covered by legislation such as Migratory Bird Convention Act, Canada Wildlife Act or National Parks Act or provincial legislation, but are not necessarily covered or legally protected. The Peace-Athabasca Delta and whooping crane nesting areas in Wood Buffalo National Park are protected because they are in Wood Buffalo National Park. The Hay-Zama Lakes area is protected by reservation by Alberta Fish and Wildlife and the Beaverhill Lake area is designated as a provincial bird sanctuary.

Future Considerations

No new sites have been proposed for designation as Ramsar sites, for consideration at the next meeting of member countries in 1993, nor is it likely that Canada will propose any more (Boyd 1991: pers. comm.).

Biosphere Reserves

The Man and the Biosphere Program (MAB) is a UNESCO program intended to extend some of the work that started in the 1960s with the International Biological Program (IBP). The main purpose of the MAB is to provide for comparative research and monitoring of areas (called Biosphere Reserves) representative of the world's biogeographical regions, so that methods of sustainable development can be demonstrated.

Biosphere reserves must represent at least one of the world's biogeographical provinces, and contain relatively undisturbed areas as well as examples of managed or transformed landscapes so that long-term comparative research can be done. There are no set limits on the size of biosphere reserves but they should be large enough to represent a self-sustaining ecosystem.

Table 5-4
Distribution of Ramsar Sites in Alberta, by Natural Region

Natural Region	AREA (km²)	SITE NAME & GENERAL LOCATION	SITE DESCRIPTION
Parkland			
Central	180.5	**Beaverhill Lake** central Alberta	waterfowl & aquatic bird habitat
Boreal Forest			
Hay R.	169.0	**Whooping Crane Summer Range** far northern Alberta	whooping crane nesting area in Wood Buffalo National Park
	500	**Hay-Zama Lakes** northwestern Alberta	waterfowl habitat
Peace R. Lowlands	3,213.	**Peace-Athabasca Delta** northeastern Alberta	large freshwater delta habitat for waterfowl, aquatic mammals, bison
ALBERTA TOTAL (No. Sites: Total Area)	**4: 4,062.5**		

UNESCO/MAB has adopted a global ecosystem classification system that identifies 193 major national regions, called Biogeographical Provinces, using 14 representative biome types found in eight realms of the world. These realms are essentially the world's major continental land masses and large oceanic archipelagos. Under this classification system, Alberta is in one realm and contains 12 biogeographical provinces (Environment Canada 1988e).

Biosphere reserves are intended to foster good resource management practices by providing the opportunity to compare areas that are relatively undisrupted because of sound resource management with areas that have been degraded by poor management; and providing for research that will result in natural resource conservation (sustainable development). Ultimately, the research of the Man and the Biosphere Program will be used to create better awareness of, and support for, more acceptable approaches to resolving conflicts between protection and use where strict preservation over a large area is not feasible.

Legislation and Government Administration

MAB is not part of any federal or federally funded program, and there is no single agency involved in the MAB in Canada. Both utilized and protected lands are included in biosphere reserves, thus making it infeasible for any one government agency, conservation organization or private landowner to have exclusive authority over the site. Cooperation among these concerned groups is key to success of the program and a local management advisory board with representatives from all those involved is normally established. A federal government agency becomes involved if some component of a biosphere reserve is under federal jurisdiction. Because Waterton Lakes is a national park the appropriate federal official is a member of the management advisory group.

In Canada, anyone who can act on behalf of a government agency or established private organization may take the initiative to nominate a biosphere reserve. Designation of areas as biosphere reserves is done through the Internal Coordinating Council of UNESCO/MAB on the basis of nominations and recommendations channelled to them through Environment Canada.

Distribution and Natural Region Representation

There are four biosphere reserves in Canada, including the Waterton Lakes Biosphere Reserve in Alberta designated in 1979 as an area representative of the Rocky Mountain and Grassland ecosystems. Waterton Lakes National Park, with an area of 525 km^2 forms the core of Waterton Lakes Biosphere Reserve. East and north of the park, private lands used for ranches, farms, oil and gas development and tourism, form the surrounding cooperation zone used to provide a basis of comparison for the different resource management practices. The adjacent Glacier National Park in the U.S. has also been designated as a biosphere reserve.

Protection and Management

Like other federal/international protection mechanisms, biosphere reserves are based on areas that already have federal or provincial protection—in this case Waterton Lakes National Park. Further destruction in the cooperation zone where resource development already exists may be restricted or reversed by decisions resulting from comparative research undertaken.

Future Considerations

No other areas in Alberta are under consideration for the Man and the Biosphere program.

Chapter 6

Mechanisms Not Covered in this Report

Many examples of protection of areas that represent Alberta's natural ecosystems have not been mentioned in this report. These include Indian reserves, Metis settlements and military reserves. Pachal (1992) notes that while Indian reserves cannot and should not be considered as an alternate means for setting aside natural lands, they do contain significantly large parcels of lands in a relatively natural state. She adds that the spiritual ties native people have to the land may ensure that these lands remain that way thereby contributing to the maintenance of ecological and wilderness benefits. Pachal (1992) and others (Wallis 1991: pers comm.) have also noted the extent of relatively natural lands in three large military reserves in Alberta: Suffield, Wainwright and Cold Lake, totalling 8,517 km^2 (Pachal 1992).

Local initiatives by municipalities (counties, municipal districts, improvement districts and cities, towns, villages) and by private landowners and organizations have already been mentioned in parts of this report, especially with respect to those natural regions that have been significantly depleted of representations of their native ecosystems (Grassland and Parkland). These areas have a high degree of private land ownership, so it is not surprising that private or cooperative arrangements between government and the private sector are occurring (see Swinnerton 1991: 44). It is beyond the scope of this report to examine all the private initiatives by fish and game organizations, private campground and recreation developers, and private land conservation organizations, to protect or conserve areas representing Alberta's natural diversity. Maintaining open spaces and natural areas in or near urban areas will become more important in the future as population densities in urban areas increase and natural areas everywhere continue to be altered and destroyed.

There are various ways individuals may ensure that the natural integrity of their land is protected. These are outlined in *Conservation Kit: A Legal Guide to Private Conservancy* (Tingley, Kirby and Hupfer 1986). Other guides for landowners outline management practices that conserve or protect natural environments, and how to attain services and funding to achieve these objectives. One example is a handbook for landowners on native prairie grassland protection: *Conservation of Canadian Prairie Grasslands - A Landowner's Guide* (Turner 1991: pers. comm.).

Many conservationists are calling for approaches to designating and protecting areas representing Canada's natural diversity, which, of necessity, involve all Canadians to complement government programs and actions. Stewart Hilts (1989: 101) says:

> *...There is a real need today to go beyond thinking about innovative private-stewardship tools such as easement, management agreements and incentives, to actually* implementing *such alternatives—not to replace government acquisition, but to complement it.*

Hilts continues by calling for a fundamental change in our view of private landowners:

> *Unfortunately, there has been a tendency to see landowners as unsympathetic to environmental concerns. Legislation has often been justified by the need to balance private greed with the public good. The controls needed to guard against extreme examples of land abuse have tended to paint all landowners with the same brush. They do not deserve it.*
>
> *We err in the wrong direction if we design our systems to control a few individuals who are at the extreme, for in so doing we destroy the motivation of the great majority. Most landowners in rural areas have a very real and personal attachment to their land. This is a positive starting-point that can be used to build a broader acceptance of conservation goals, if we recognize the immense contribution that thousands of individuals can make.*

A variety of programs and actions already protect natural ecosystems that are privately owned (see also Wildlife Habitat Canada 1987). These range from paid to voluntary, and from complementary stewardship in association with farming to preservation that reflects the pattern of ownership (for example, in Ontario half of landowners are nonfarm residents, whereas in the prairies a much higher percentage of land is farmer-owned).

Since 1963, for example, the Nature Conservancy of Canada has preserved more than 250 km^2 across Canada through private and corporate donations and endowments. The Nature Conservancy provides a vehicle by which private land can be obtained quickly, through purchase or endowment, and then transferred to an appropriate organization (sometimes government) for management. Wildlife Habitat Canada and Ducks Unlimited are also involved in land purchase and enhancement projects (Posey 1992: 34).

The key to successful protection of private land supporting what remains of native ecosystems, appears to be flexibility and acceptability by landowners. Direct personal contact with owners and a variety of approaches that are fair, equitable and easy to operate, will ensure that more private land remains natural in the future.

Chapter 7

Summary and Discussion

The Extent of Protected Lands in Alberta

Overall Representation

Table 7-1 summarizes, by natural region, the distribution of the mechanisms discussed in this report. These mechanisms at the least, restrict activities in the designated "natural" areas and at best protect them from significant alteration or disruption by human activities. Totals are not included on this table because several of the designated areas overlap, e.g., Eastern Slopes Zone 1 and Wilderness Areas. Table 7-2 lists these designations by total area, from largest to smallest.

Table 7-2
Ranking of Mechanisms by Total Area Represented by Each Category
(refer to Table 7-1)

Ranking by Total Area of Category
(largest to smallest - total area in km² (% of province represented)

1. FMA Areas	135,440	20.5%*
2. (1)National Parks-	54,084	8.2%
3. Eastern Slopes Zone 1	12,800	1.9%
4. (1)Forest Land Use Zones	6,243	0.9%
5. Eastern Slopes Zone 2	5,900	0.9%
6. Wildland Recreation Areas	4,613	0.7%
7. (1)Willmore Wilderness	4,597	0.7%
8. Protective Notations	3,414	0.5%
9. Protection Zones (IRP)	2,700	0.4%
10. (1)Provincial Parks	1,424	0.2%
11. Other Wildlife Habitat Programs	1,247	0.2%
12. (1)Wilderness Area-	1,010	0.2%
13. (1)Wildlife Sanctuaries	790	0.1%
14. (1) Provincial Rec. Areas	557	0.1%
15. (1)Natural Areas	356	0.1%
16. (1)Ecological Reserves	247	< 0.1%
17. (1)Migratory Bird Sanctuaries	142	< 0.1%
18. (1)Restricted Develop. Areas	178	< 0.1%
19. (1)Forest Recreation Areas	89	< 0.1%
20. (1)Habitat Development Areas	31	< 0.1%
21. (1)Alberta Culture	8	< 0.1%
22. (1)National Wildlife Areas	4	< 0.1%

FMA - Forest Management Agreement
IRP - Integrated Resource Plans
< - less than
* 13.3% of the province in the FMA areas is considered "productive" and hence harvestable
(1) Legislated mechanisms: established through specific statute or by Order-in-Council or regulation as authorized by statute

Table 7-1
Summary of Mechanisms Discussed in this Report

Alberta's Natural Regions	**Grassland**						**Parkland**						**Foothills**			
Subregions	Mixed		N. Fescue		Foothills		Central		Foothills		Peace R.		Main		N. Outliers	
	No.	Area km^2	No.	Area km^2	No.	Area km^2	No.	Area km^2	No.	Area km^2	No.	Area km^2	No.	Area km^2	No.	Area km^2
MECHANISMS																
Alberta Government																
Forestry, Lands and Wildlife:																
Willmore Wilderness																
Natural Areas	2	58	1	0	0	0	25	22	1	1	3	12	6	18	0	0
Protective Notations (1)																
Wildlife Sanctuaries (2)	2	149					3	118	1	58			1	110		
Habitat Develop. Areas	1	22					1	1					1	8		
Other Habitat Programs	73	3	9	1	5		5	1,060								
Forest Management Agree (3)											1	540	7	33,220	4	7,010
Forest Land Use Zones													4	1,134		
Wildland Rec. Areas													1	793		
Forest Rec. Areas (4)											3	1	101	61	7	2
E. Slopes Policy – Zone 1- see text for approximate distribution by natural region																
E. Slopes Policy – Zone 2 - see text for approximate distribution by natural region																
IRPs: protect. zones (5)																
Tourism, Parks and Recreation:																
Provincial Parks (6)	8	89	2	8	4	79	15	53	4	12	4	3	3	63	1	30
Ecological Reserves	1	11	1	22	0	0	2	62	0	0	1	18	1	8	1	12
Wilderness Areas																
Provincial Rec. Areas	2	0	4	0	2	0	7	98	0	0	2	0	5	3	0	0
Alberta Environment: RDAs (6)							4	73	2	81						
Alberta Culture & Multiculturalism	2	1	1	1					2	1						
Federal Government																
National Parks (7)									1	50						
Migratory Bird Sanctuaries							1	1	1	2	1	11				
National Wildlife Areas							1	1								
Can. Heritage Rivers (8)																
International Programs																
World Heritage Sites (9)	2	106														
Ramsar sites							1	181								
Biosphere Reserves																
No. Designated Sites	21		10		6		64		12		15		130		13	
Subregion Area (km^2)		61,480		20,220		8,985		63,910		2,980		14,400		67,820		14,400
Legislated Protected Areas (excluding Forest Land Use Zones)	18	330	9	31	6	79	59	429	12	205	14	45	118	271	9	45

Notes to Table 7-1

1. Protective Notations for: Natural Areas – 151: 699 (151 sites for total of 699 km^2); Forest Recreation Areas – 294:2,121; Provincial Parks & Recreation Areas – 23:529; Ecological Reserves – 3:65
2. Includes wildlife and game bird sanctuaries
3. Rough estimates of existing areas. Between 12 and 35% of FMA areas can be considered nonproductive for forestry – see Table 5-9 There are 12 existing Forest Management Agreement Areas – some straddle more than one subregion, hence the total is 25
4. Number of sites refers to number of named locations, not reservations (there may be more than one per location)
5. No breakdown by subregion available
6. Environmental RDAs only
7. Rough estimates for subregion distribution, based on consultation with K. Morrison (Alta. Tourism, Parks & Recreation) and C. Wallis (Cottonwood Consultants)
8. Total of 216.5 km designated within Jasper and Banff National Parks
9. Includes Wood Buffalo, Jasper and Banff National Parks

Table 7-1
Summary of Mechanisms Discussed in this Report

Boreal Forest								Rocky Mountain				Canadian Shield				Totals per Mechanism			**Alberta's Natural Regions**
Subarctic		Hay River		Peace Low		Mxdwood		Montane		Subalpine		Kazan Uplds		Ath. Plain					Subregions
o.	Area km²	No.	Area km²	No.	Area km²	No.	Area km²	No.	Area km²	No.	Area km²	No.	Area km²	No.	Area km²	No.	km²	% of Alberta	**MECHANISMS**
																			Alberta Government
																			Forestry, Lands and Wildlife:
										1	4,597					1	4,597	0.7%	**Willmore Wilderness**
0	0	0	0	0	0	73	171	3	9	4	65	0	0	0	0	118	356	0.1%	**Natural Areas**
																471	3,414	0.5%	Protective Notations (1)
				1	116	1	239									9	790	0.1%	**Wildlife Sanctuaries (2)**
																3	31	0.0%	**Habitat Develop. Areas**
						1	10									288	1,247	0.2%	Other Habitat Programs
1	600			1	220	9	93,080			1	330			1	440	12	135,440	20.5%	Forest Management Agree (3)
										6	5,109					10	6,243	0.9%	Forest Land Use Zones
								1	595	2	3,225					4	4,613	0.7%	Wildland Rec. Areas
1	1	7	2	4	2	41	8	6	3	8	8			3	1	181	89	0.0%	**Forest Rec. Areas (4)**
																	12,800	1.9%	E. Slopes Policy – Zone 1- see text fc
																	5,900	0.9%	E. Slopes Policy – Zone 2 - see text fc
																	2,700	0.4%	IRPs: protect. zones (5)
																			Tourism, Parks and Recreation:
0	0	0	0	0	0	21	434	3	152	1	501	0	0	0	0	62	1,425	0.2%	**Provincial Parks (6)**
0	0	0	0	0	0	2	18	2	58	0	0	0	0	1	38	12	247	0.0%	**Ecological Reserves**
										3	1,010					3	1,010	0.2%	**Wilderness Areas**
0	0	0	0	0	0	26	456	1	0	0	0	0	0	0	49	49	557	0.1%	**Provincial Rec. Areas**
						1	2	1	22							8	178	0.0%	**Alberta Environment: RDAs (6)**
								2	5							7	8	0.0%	**Alberta Culture & Multiculturalism**
																			Federal Government
1	2,000	1	13,600	1	20,215	2	225	2	533	3	17,461					5	54,084	8.2%	**National Parks (7)**
				1	127											4	142	0.0%	**Migratory Bird Sanctuaries**
						2	3									3	4	0.0%	**National Wildlife Areas**
												216.5 km in Jasper and Banff National Parks –							Can. Heritage Rivers (8)
																			International Programs
1	2,000	1	13,600	1	20,215	1	333			2	17,186					4	53,440	8.1%	World Heritage Sites (9)
		2	669	1	3,213											4	4,063	0.6%	Ramsar sites
								1	132	1	393					1	525	0.1%	Biosphere Reserves
																0	0	0.0%	
4		11		10		180		21		32		0		5					**No. Designated Sites**
	30,860		50,030		30,090		233,625		7,365		36,380		7,300		11,340		661,185	100%	Subregion Area (km²)
2	2,001	8	13,602	7	20,460	168	1,556	20	783	20	23,643	0	0	4	39	466	63,518	9.6%	**Legislated Protected Areas** (excluding Forest Land Use Zones)

About 9.6% of Alberta is represented by legislated protected areas (Table 7-1). (Forest land use zones, although established pursuant to regulations under the Forests Act, are considered a restriction but not a protection mechanism.)

National parks comprise the largest type of legislated protected area, covering 8.2% of Alberta, mostly in the Peace River Lowlands of the Boreal Forest and the Subalpine/Alpine areas of the Rocky Mountains. The federal government, primarily through national parks, administers about 85% of the total area protected by the mechanisms discussed.

About 8.9% of the province is covered by areas in which resource extraction, permanent residence and hunting are specifically excluded. Private lands and Willmore Wilderness Park, where hunting is allowed, fall into this category. About 9.3% of Alberta is covered by designated protected areas larger than 10 km², including areas where hunting may be allowed. Only 9.1% of Alberta is represented by designated areas greater than 100 km².

Figures 7-1 and 7-2 illustrate the distribution of the 466 legislated protected sites, by size and total area. Most sites are very small, and six large protected areas account for more than 90% (more than 63,000 km²) of the total area under protection in the province. Most, 60% (276), are less than 1 km² in size and represent 81 km², only 0.1% of the total area under protection (Figure 7-2). The 129 sites that are between 1 and 10 km² similarly represent a small proportion of the total area, 383 km² or 0.6%. Sites in the 10 to 50-km² size category (numbering 34) and 50 to 100-km² size categories (numbering nine) cover about 700 km² for each (just over 1% of the province's protected land area). Only 12 sites are between 100 and 500 km² in size and they account for only 4.2% of the total area, while six areas larger than 500 km² account for 92.9% of the total area under protection in Alberta.

Representation by Natural Region

Figure 7-3 illustrates the overall areal representation by natural subregion of the 466 legislated protected sites, excluding forest land use zones. Representation of each of Alberta's 17 natural subregions ranges from zero or less than 1% to more than 60%. For example, 68% of the Peace River Lowlands subregion of the boreal forest has been designated as protected as has 65% of the combined area of the Subalpine and Alpine subregions of the Rocky Mountains.

Canada's largest national park, Wood Buffalo National Park and two wildlife sanctuaries account for the 20,460 km² of the Peace River Lowlands that are legally designated.

In the Subalpine and Alpine subregions of the Rocky Mountains, about 23,643 km² are formally protected by large areas such as national parks, wilderness areas, Willmore Wilderness Park and Alberta's largest provincial park, Peter Lougheed Provincial Park.

Only one designated area, Wood Buffalo National Park, protects about 27% (13,600 km²) of the Hay River and 6.5% (2,000 km²) of the Subarctic subregions of the Boreal Forest Natural Region.

Almost 11% (783 km²) of the Montane subregion of the Rocky Mountains is protected, primarily by national parks (Banff and Waterton), ecological reserves, restricted development areas (Turtle Mountain) and three provincial parks—Cypress Hills, Bow Valley and Beauvais Lake.

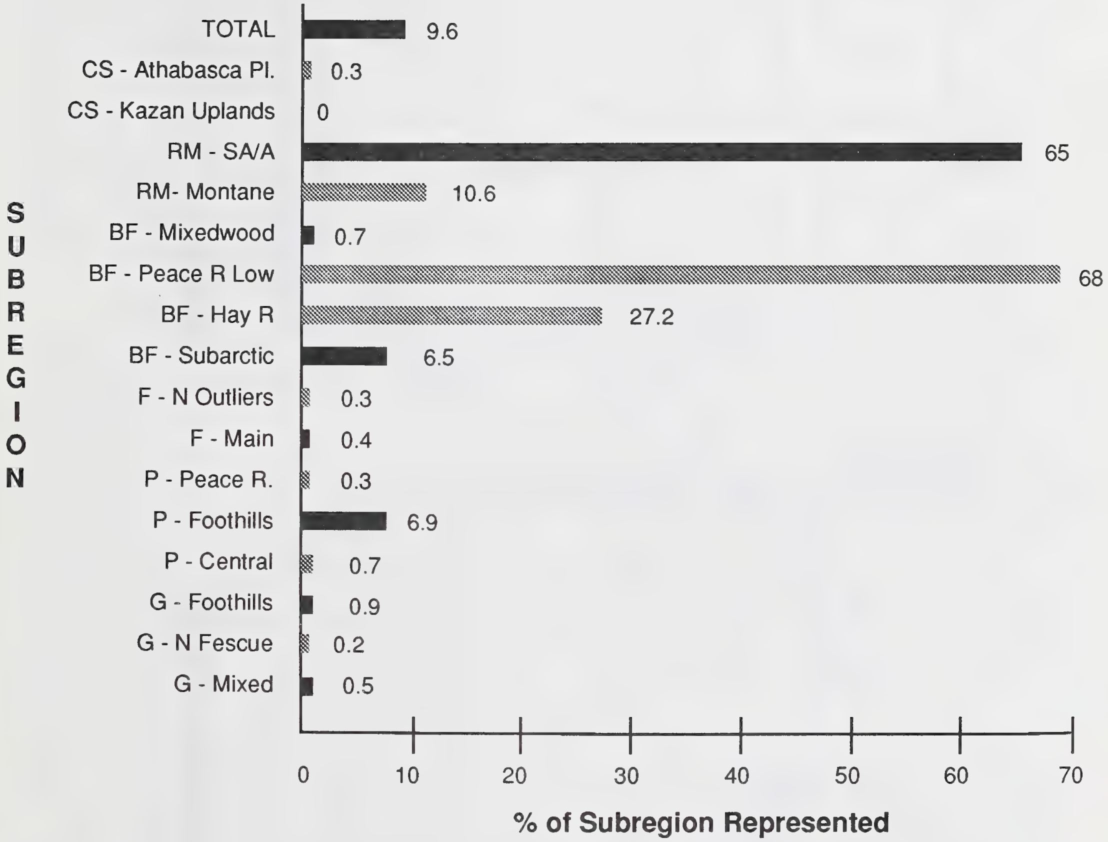
Representation in these six subregions covers 9.1% of Alberta or 95.2% of all the legislated protected areas, highlighted in Table 7-1.

Representation in the Parkland Natural Region is much less: 0.7% (429 km²) for the Central subregion, 6.9% for the Foothills subregion (205 km²) to 0.3% for the Peace River Parkland (45 km²). Sites in the Parkland are relatively small and often already significantly altered from their naturally diverse state – active habitat development or restoration may be taking place on these sites.

The remaining eight subregions have protected areas that cover **less than 1%** of each subregion. The highest rate is 0.9% for the Foothills subregion of the Grasslands and the lowest is 0% for the Kazan Uplands of the Canadian Shield. The Mixedwood subregion of the Boreal Forest is significantly underrepresented (0.7%) considering that this subregion covers 266,075 km² or 40.2% of the entire province. The largest site in this subregion is the 441-km² Lakeland Provincial Recreation Area.

Most conservation agencies recommend that at least 10 to 12% of each natural subregion be protected in its natural or indigenous state (Public Advisory Committees to the Environment Council of Alberta 1990; World Wildlife Fund 1990). This approach, however, ignores not only the great variations that exist within natural regions, but also the size, type, threats and condition of existing representative areas and potential protection mechanisms. For example, in the past, development occurred without consideration for maintaining a diversity of landscapes representative of the pre-development conditions, such as in the grasslands of

Figure 7-3
Subregion Representation by
Legislated Protected Areas
(highlighted on Table 7-1)



LEGEND:
CS - Canadian Shield
RM - Rocky Mountain
BF - Boreal Forest
F - Foothills
P - Parkland
G - Grassland

Figure 7-1
Distribution of Protected Areas in Alberta, by Size

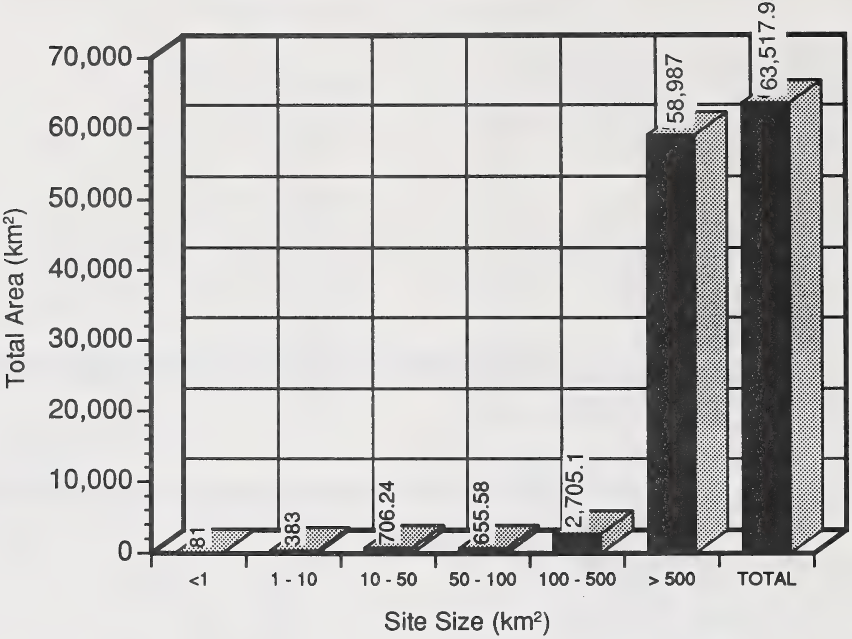
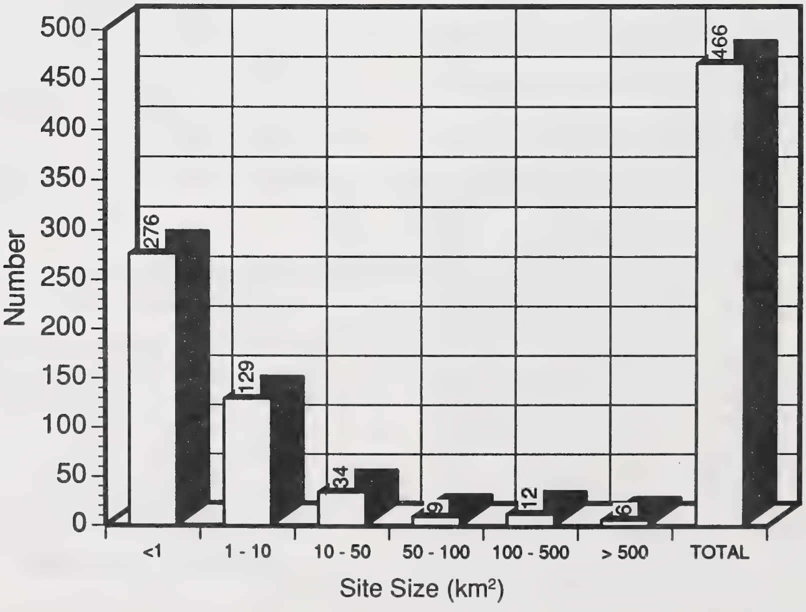


Figure 7-2
Distribution of Protected Areas, Showing Total Area Represented by Sites of Various Sizes



Alberta. As a result, overall representation to a level of 10% is highly unlikely in the Mixed and Northern Fescue Grassland. On the other hand, because of the diversity of landscapes in each natural region (Alberta Tourism, Parks and Recreation has identified 134 landscape themes for Alberta, Morrison 1991: pers. comm.), current representation may exclude many of its different landscapes, unique features and species.

Most of Alberta's native ecosystems are underrepresented and unprotected by the present situation. Only five of the 17 natural subregions have overall representation levels greater than 10% and even in these regions special and unique sites remain unprotected (Pachal 1991: pers. comm.; Wallis 1991: pers. comm.). Assessing the adequacy of representation begins with what is "left out." But there are a number of other factors that contribute to how adequate the designated areas contribute to maintaining and protecting the natural diversity of the province. These are described in the next section.

Factors Contributing to the Protection of Alberta's Natural Diversity

Table 7-1 provides a summary of the mechanisms discussed in this report. It must be noted that not all the sites on the list "protect"—many do not protect, but "restrict" uses. Many of the sites that governments term "protected" do not provide protection from the domination of humans and activities such as resource extraction. This applies to such areas as forest and provincial recreation areas, which are small and sustain concentrated use, natural areas (especially recreational and educational), various ecological reserves, smaller provincial parks, urban wildlife sanctuaries and sites managed according to government departments' policies and/or programs.

There are three major factors that determine the success of mechanisms in maintaining ecological diversity. These are:

1. the nature of the designated areas themselves, including
   (a) inherent biodiversity and "naturalness,"
   (b) presence of unique or otherwise significant features,
   (c) size, and
   (d) degree of human domination on and around the site.
2. specific protection mechanisms and their implementation, including
   (a) legislation,
   (b) policy and regulation,
   (c) management objectives and strategies, and
   (d) monitoring and enforcement.
3. the existence of a provincewide protection system to ensure that all natural ecosystems in the province are adequately represented and designated sites protected.

The Nature of Designated Areas

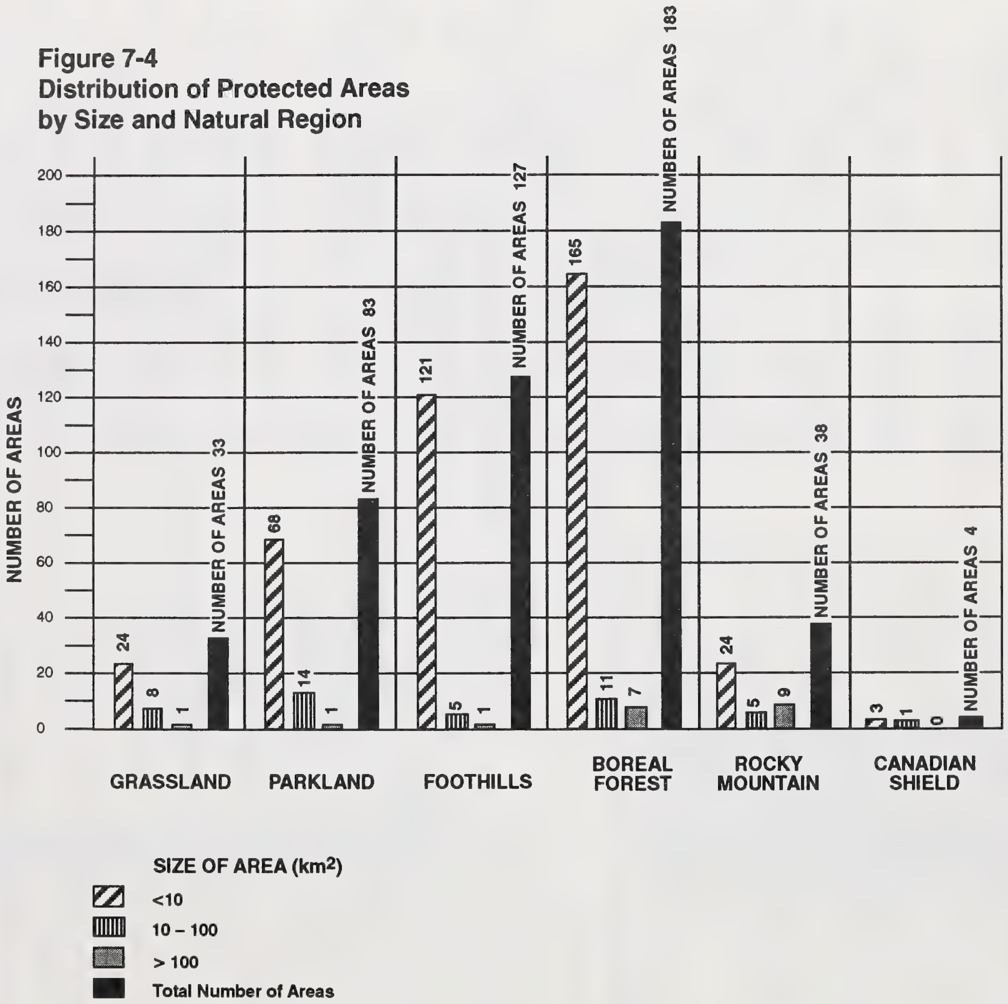
Natural environments in Alberta exhibit incredible diversity of life—even the simplest has dozens of different landscape combinations, hundreds of plants and animals and thousands of insects. The most "natural" environment is one in which humans have minimal effect on its processes and species. The areas designated in Alberta (excluding small intensively used recreational sites) represent a continuum of naturalness, from sites that are being actively developed and managed to restore habitat and wildlife (such as in the Grassland and Parkland natural regions) to remote, rarely visited areas in the mountains or northern Alberta. Some sites, although small, protect unique features or populations e.g., Kennedy Coulee Ecological Reserve protects the piping plover habitat at Little Fish Lake.

To represent the ecological diversity of Alberta, designated areas or strings of areas, must reflect the diversity and proportion of features relative to their original extent in each natural subregion (Webb 1987).

The size of designated areas is a major factor in assessing the adequacy of a system of protected areas. The distribution of sites by size among the six major natural regions is shown in Figure 7-4. The inverse relationship between number of sites and the total area represented is evident. For example, although the Boreal Forest has 183 sites, 53% are less than 1 km² and represent mostly the Mixedwood subregion. In contrast the Rocky Mountain region, which is well represented (see Figure 7-3), has 40 areas, including substantial portions of three of the five national parks in Alberta.

Designated sites must be large enough to remain viable (Nature Conservancy Council as cited in Peterson and Peterson 1991). This means that there should be resistance by the flora and fauna to edge

Figure 7-4
Distribution of Protected Areas
by Size and Natural Region



effects, loss of species and colonization of unwanted species. On a species level this means that there should be self-sustaining populations whose numbers, population structure (age class and sex ratios) and patterns of dispersion are sufficient to minimize the chances of extinction (Wilcox 1982).

According to Zimmermann and Noss (1990), the most viable areas are the largest because they:

- are easier to defend against encroachment;
- have less intensive edge or boundary effects;
- require less intensive management per unit area;
- have lower extinction rates and higher colonization rates;
- are more likely to maintain populations of space-demanding species (including summit predators such as cougars, grizzlies and wolverines); and
- are more likely to maintain intact and relatively stable examples of natural ecosystems, including natural disturbance areas (that have been affected by such factors as fires, floods, slope instability etc.).

Whereas "the bigger the better" approach applies, there are lower limits on size that will determine how diverse and viable a protected area will continue to be. Hackman (1990) has suggested that wilderness areas be no less than 5,000 km². Others have said that there should be at least 16 km to the nearest road (making areas at least 800 km² in size). Eagles (1984) has suggested a minimum area of 4 km² is sufficient, but acknowledges that this eliminates predators such as bears, wolverines and cougars. Yet others say that 100 km² (just over a township) is a conservative, minimum figure (Wallis 1991: pers. comm.). Peterson and Peterson (1991:7) acknowledge that the goal of representativeness is more relevant for large protected areas than for small ones but add that the chances of long-term representation of habitats in protected areas smaller than national parks can be increased by reserving recognized communities and habitats in triplicate.

In Alberta, of the more than 400 different sites with restrictions on use for environmental reasons, only 61 are greater than 10 km² (see Figure 7-1). Many of the 276 smaller than 1 km² are heavily used by people, primarily for recreation, which may further erode each area's ability to function and support a wide range of species. A ranking of protected areas by size (down to 10 km²) is presented in Appendix D.

National parks comprise more than 85% of the total area legally protected in Alberta. The largest protected areas in Alberta are three national parks: Wood Buffalo (35,845 km²), Jasper (10,878 km²) and Banff (6,641 km²). These parks also provide the greatest protection to the ecosystems within their boundaries, since up to 98% of their area classified as wilderness with very limited accessibility and facility development. Hunting is not allowed in the national parks. The Canadian Parks Service has recently begun controlled burning to simulate natural processes.

Nine of the 20 largest protected areas are found in Rocky Mountain Natural Region, mostly in the Alpine and Subalpine subregions. In addition to Jasper and Banff national parks, these include Willmore Wilderness Park (4,597 km²), Waterton Lakes National Park (525 km²), Peter Lougheed Provincial Park (501 km²), White Goat (445 km²), Siffleur (412 km²) and Ghost River (153 km²) wilderness areas and part of Cypress Hills Provincial Park, classified as Montane (205 km²). These areas provide considerable protection because they are large tracts with little access and facility development, except for localized development in the national and provincial parks. There are only six other sites greater than 10 km² in the Rocky Mountains—five in the Montane subregion and one in the Subalpine/Alpine.

The distribution of sites greater than 10 km² and greater than 100 km², by natural region is listed in Table 7-3.

Table 7-3
Distribution of Larger Designated Protected Areas, by Natural Region

Natural Region	No. of Sites Greater than 10 km²	No. of Sites Greater than 100 km²
Grassland	11	2
Parkland	20	2
Foothills	5	1
Boreal Forest	23	9
Rocky Mountain	16	11
Canadian Shield	1	0

The Grassland Natural Region has two sites larger than 100 km²: Pakowki Lake Wildlife Sanctuary, which is dry most of the time, and the lower elevations of Cypress Hills Provincial Park. The Central Parkland has two sites greater than 100 km²: the North American Waterfowl Management Plan "First Step" area near Buffalo Lake (850 km²) and

Beaverhill Lake (181 km^2). These sites are more in the habitat development and restoration category than strict protection and retention of diverse natural areas. This is true for the several Wetland for Tomorrow projects in the Parkland and Boreal Forest natural regions. The Foothills Natural Region has only one designated area larger than 100 km^2: the 110-km^2 Camp 1 Wildlife Sanctuary, which is mostly reforested land. Four of the nine areas recorded in the four subregions of the Boreal Forest are within national parks (Elk Island and Wood Buffalo). Two were designated in early 1992: Lakeland Provincial Recreation Area (441 km^2) and Lakeland Provincial Park (147 km^2). The remaining three sites are reserved for wildlife: the 239-km^2 Lac La Biche Game Bird Sanctuary, the 127-km^2 Migratory Bird Sanctuary (federal) and the 117-km^2 Game Bird Sanctuary (provincial), both on Richardson Lake. No sites greater than 100 km^2 are found in the Canadian Shield.

Large protected areas contribute significantly to a region's protection status. The low percentage regions shown in Figure 7-3 (all three subregions of Grassland, Peace River Parkland, both subregions of the Foothills, the Mixedwood Boreal Forest, the Montane subregion of the Rocky Mountains, and both subregions of the Canadian Shield) do not have significantly large representative areas set aside. The Central and Foothills Parkland rate only slightly better.

The natural resource potential and human settlement history of Alberta have had a major impact on attempts to formally protect examples of native ecosystems and the type of mechanisms employed. For example, the Rocky Mountains were not easily settled but were (and still are) a major tourist attraction. In contrast, the natural productivity of the prairies and parkland were seen as an indicator of their potential for agriculture, and so were substantially developed for that purpose. The Foothills, and more recently the Mixedwood Boreal Forest, were recognized for their abundant natural resource potential, notably for forestry, oil and gas, and mineral development. Requests to protect large areas representative of these natural regions is seen as a threat to reduce or eliminate their economic development potential.

Hence in the Rocky Mountains, large protected areas (such as national parks, wilderness areas and wilderness parks) were designated earlier in this century. More recently, other mechanisms (such as natural areas and ecological reserves) were used to protect smaller and sometimes less wild areas in the more settled parts of the province.

Another common protection pattern in the more developed parts of the province is the "natural-is-what-is-left-over" phenomenon; what isn't deemed useful for other purposes is left "natural." This ignores the fact that, for example, productive agricultural land is also very productive for a wide variety of wildlife (many of which have disappeared). It also ignores the fact that tracts of merchantable timber are part of vital natural ecosystems that are continuous with "nonproductive" lands.

Another factor contributing to the degree of protection provided by these mechanisms is the influence of surrounding land uses on the designated area. For example, in the Central Parkland, many sites are surrounded by cultivated or grazed land. This proximity and intensity of human use can affect the viability and diversity of the designated area. Although some legislation, such as for ecological reserves, mentions the need for buffers and conservation agreements with adjacent landowners, there has been little effort to provide such zones around sites in Alberta. This is particularly important for smaller sites, which already have limited diversity and viability, although Kevin McNamee sounds a warning for larger areas as well:

> *Increasing resource developments adjacent to parks and wilderness areas are slowly destroying the ecological integrity of these reserves. Park agencies have failed in many cases to secure cooperation from adjacent landowners, because the policy of letting nature take its course is seen as having a detrimental effect on land adjacent to parks—loss of livestock to bears and wolves, destruction of crops by wildlife and so on (McNamee 1989: 77).*

Small, intensively used sites and trail systems such as recreation sites and small provincial parks contribute indirectly to protection by concentrating human use, thus reducing more dispersed disruption of adjacent native ecosystems. This does not apply to regions of the province that are already significantly developed and have little area available for outdoor recreation and wildlife.

Protection Mechanisms and Their Implementation

To assess if and to what extent protection is actually afforded by formally designated areas in Alberta, there are four factors that must be examined: the legislation itself; regulations and policy that have been developed to further articulate the legislation and provide guidance to administering agencies; specific management plans developed; and the monitoring and enforcement of activities and use of these areas.

The Legislation

There are several legal mechanisms that afford protection for representative examples of Alberta's native ecosystems. Among these are Acts specific to one area, such as the Willmore Wilderness Park Act, or provide very specific and strict restrictions on use, as found in the Wilderness Areas, Ecological Reserves and Natural Areas Act. Other broad acts that are not site-specific have nonetheless formed the basis for regulations and policies that protect remnants of natural ecosystems. Such are the regulations of the Wildlife Act, which provide for the establishment of wildlife sanctuaries that do not protect habitat *per se,* but rather restrict consumptive use of wildlife. Policy directions, such as the adoption of the integrated resource plans, are based on interpretation of sections 8 and 10 of the Public Lands Act.

As a beginning, it is felt that the more that is included in formal legislation the better the protection that can be achieved. This has been reasonably successful, for example in the case of Willmore Wilderness Park, which has its own Act and is fairly specific in terms of prohibited uses. However, the Act gives the Minister significant discretion when it comes to changing boundaries (which has happened twice since it was created).

The best protection legislation provides a clear and comprehensive starting point for regulations, policies, management planning and actions on the ground. This includes a clear statement of purpose, identification and definition of each protected area, a list of the range of activities permitted and provision for establishing the areas and managing them (Bailey 1990). It also requires public consultation as a condition of any changes in boundaries or zoning, rather than leaving these to Ministerial discretion or cabinet order.

Including all these factors in the legislation itself means that any changes must be made under public scrutiny in the Alberta Legislative Assembly or the House of Commons. Amendments must be debated and passed by elected members, which makes the process public and participatory. Governments claim that "enshrining" these areas in legislation is cumbersome and affords little flexibility—it takes much time and effort to make changes to the status of protected areas. However, long-term protection starts with this level of identification and legalization.

Many mechanisms described in this report are created by Orders-in-Council, decisions of cabinet, without public debate. This is true for natural areas, ecological reserves, even provincial parks. While this may be more expedient and ensure future government flexibility, it means that areas created by Orders-in-Council can, as Edwards (n.d.: 4) says, "...be just as simply erased by other equally quiet Orders-in-Council."

A major flaw in many existing protection Acts and regulations is that they provide little or no direction for responding to development proposals within or adjacent to designated areas. In other cases, if discretionary power is identified, it favours the Minister ruling against protection; for example, the power of the Minister of Tourism, Parks and Recreation with respect to existing uses on ecological reserves. A notable exception is the Historical Resources Act, which provides the Minister with considerable power to protect and control the resources that fall under his responsibility.

The inclusion of such detail and discretionary powers in the legislation governing a particular site is no guarantee that protection will occur. It is the interpretation of the legislation by the administering agency, and the supporting policies and regulations that it develops, that provide the basis for management of the area. And it is the allocation of staff and resources to carry out and enforce these initiatives that ensures that the sites contribute to the long-term viability of representative examples of Alberta's natural ecosystems.

Policy and Regulations Associated with Provincial and Federal Protection Mechanisms

"Policy" is used to describe a wide range of directives, articulated publicly or within departments, to guide government programs and actions. Most of the government departments administering protected areas in Alberta have some form of public policy document; for example, the Eastern Slopes Policy, the Fish and Wildlife Policy and the Water Management Principles. Alberta Tourism, Parks and Recreation is an exception: its *Foundation for Action* document has never been publicly released.

At the working level, within departments, more detailed policies relating to the management of sites may also exist, as in the case of natural areas. Policies act as contemporary reference points for both the public and the administering agency in addressing various kinds of protection issues, from the most general, such as selection of representative sites, to the most specific such as signing and prohibition of certain uses. Policies are not the law and they can be changed at any time, without public input or scrutiny. They are also prone to subjective interpretation and may be inconsistently applied.

Almost all the legislation discussed in this report has accompanying regulations that govern how areas will be managed and used. People using many of these areas, such as Willmore Wilderness Park, forest land use zones, wildlife sanctuaries and provincial parks, should consult these regulations that outline which, when and where activities are allowed and the consequences of violation.

Basic legislation can be rendered ineffective, without supporting policies, regulations, staff and resources. The absence of policy and regulations for Alberta's ecological reserves, for example, along with the lack of action to restrict or curtail longstanding lease arrangements in some ecological reserves, has left many of them in a status quo or "in limbo" state. In contrast, the Natural Areas Program, with Ministerial support and staff, has been successful in designating and managing examples of Alberta's natural heritage.

Management Plans

When administrators mention management plans, many people think of active development of an area. Management plans for protected areas are far from this—they provide general guidelines for addressing the many activities and changes that may affect a protected area. This includes public access and use of the area, selective harvesting and hunting to simulate natural ecosystem processes, and responding to fire, insect infestations and disease. They also provide direction for the area as it evolves and changes over time.

Most protected areas larger than 10 km², for example, do not yet have management plans. Those that do include the national parks (such plans are either completed or being revised), five natural areas, some habitat development areas and habitat enhancement areas. Notable exceptions include Willmore Wilderness Park, wildlife sanctuaries and migratory bird sanctuaries, provincial parks, ecological reserves, wilderness areas and Bighorn Wildland Recreation Area. Management plans are developed in consultation with the public, and, once approved, represent an area-specific pact between responsible agencies and the public they serve.

Monitoring and Enforcement of Activities and Use of Protected Areas

While intensively used sites such as provincial and forest recreation areas, and developed areas of the national and provincial parks are monitored and patrolled for people reasons (e.g., security and protection of users and facilities), there must also be regular monitoring and research of protected areas to ensure that protection is continuing. This must be done in ways that do not interfere with natural processes in the areas.

Most areas are "regularly" monitored (several times a year, every year or so or even less frequently) by government personnel who are usually department field staff (Fish and Wildlife officers, park rangers or wardens, forest rangers). Most staff are able to generally assess the condition of sites as well as prosecute violators. However, with the trend to reduce staff, government monitoring and enforcement may become less frequent. To counteract this trend, the role of volunteers, the public and individuals must increase if these sites are to remain protected.

The Volunteer Steward Program of the Natural and Protected Areas Section of Public Lands Division partially meets these objectives. People or groups interested in a site and its protection visit regularly and monitor it for changes. This process not only encourages people to develop observation skills and enjoy the area, it also encourages them to participate in the maintenance and protection of these precious examples of natural ecosystems. The ultimate responsibility for consistent and long-term protection of designated areas, however, should remain with government, acting on behalf of all citizens.

A Provincewide Protection System

A provincewide plan or framework for protecting representative examples of Alberta's native ecosystems does not exist. Such a plan would remedy the inconsistent and inadequate representation of Alberta's ecological diversity. Such a plan would also ensure that designated areas remain viable examples of Alberta's native ecosystems, rather than be threatened by competing or adjacent land uses and by lack of attention by government agencies responsible for them.

Government departments, provincial and federal, have addressed the need to protect examples of native ecosystems, in a variety of ways, with varying levels of success. Several have enacted legislation recognizing the need for protected areas representative of Alberta's ecological diversity. These include natural areas, ecological reserves, provincial parks. However, these programs along with others, have fallen short of that objective. A systems plan for provincial parks, for example, has been prepared but never made public or implemented. This plan would provide direction for completing a system of parks that represents the ecological diversity of the province. It would also clarify management policies regarding development and activities in parks.

A cooperative effort among provincial government agencies to oversee the protection of representative examples of native ecosystems, or to develop and implement a provincewide plan has never been undertaken. The Prairie Conservation Action Plan, a cooperative, multiagency initiative, has begun to address this issue but for only two of Alberta's six major natural regions, the Grassland and the Parkland. Swinnerton (1991) notes that it is generally recognized that a holistic management approach is required to maintain long-term benefits from designated areas such as parks or recreation areas.

Guidelines for Maintaining Alberta's Ecological Diversity

This report has underscored the inadequate and inconsistent representation of many of Alberta's native ecosystems. Meanwhile, human "progress" continues—and Alberta's native ecosystems continue to be eroded. Agriculture, forestry, oil and gas exploration and development, mining and urbanization are particularly destructive. As we learn the lessons of lost ecosystems in other parts of the world, we are challenged to focus on our province's situation and to "think globally and act locally."

Action is required. There must be a comprehensive, cooperative system of protected areas for the province of Alberta. This system would have several characteristics:

1. Representation in every subregion by a range of mechanisms, small and large. The Alberta Recreation and Parks *Foundation for Action* (1988) document emphasized the role of large parks in protecting examples of Alberta's natural ecosystems. ECA public hearings on the Eastern Slopes in 1974 recommended that at least one large recreational wilderness area in each of the major river basins be designated.
2. A Continuum of Site Types. This would range from the small, "locally loved" sites in or near areas dominated by humans, to large, "remote" wilderness areas. Small sites would act as stepping stones to larger reserves, serve to maintain specific microhabitats and species, and provide opportunities for local recreation and education. Webb (1987: 8) notes that large reserves tend to have a greater number of and more extensive habitats and so support more species and larger populations than smaller reserves.

   By consensus, the most useful regionalization is a multiscale, hierarchical system whose nested units, from large to small, are delineated according to visible ecological relationships between climate, landforms and biota (primarily vegetation) (Rowe 1990b: 6).

3. Representativeness encompassing the "typical" and the unique as well as landform diversity.

   Ideally, to achieve satisfactory representation of a landscape, a park area must encompass a reasonable sample of topographic variety, the full elevational range and a balanced selection of solar aspects, drainage and other large-scale variations that tend to govern the occurrence of floral and faunal patterns. This will best serve the social and ecological values of the representation goal (British Columbia Ministry of Parks 1990).

   To maintain both original species and natural processes, examples of common and scarce habitats, as well as rare species, should be protected (Webb 1987).

   Alberta Tourism, Parks and Recreation (Morrison 1991: pers. comm.) distinguishes among several natural history themes in each natural subregion in the province. These themes are based on topographical characteristics such as: nonsandy upland, sandy upland, valley/ridge, wetland and glacier/snowfield. Some have other subcategories. A total of 134 such themes have been identified for Alberta.

4. Protection Target Levels to be set on a subregion by subregion basis, not based on the entire province.
5. Connection of protected areas to other semiwild or wild ones, to reduce habitat fragmentation and resulting loss of biodiversity. Webb (1987) states that where large tracts of land are not available,

measures to connect reserve areas should be taken. This could be achieved by the protection of corridors, especially along watercourses.

Achieving Better Representation

This provincewide protection system must be based on several factors:

1. The location, extent and nature of remaining examples of Alberta's native ecosystems,
2. A determination of which mechanisms are most appropriate and likely to succeed, considering, for example, land ownership patterns and use; and
3. An implementation plan that sets priorities for action so that maximum protection can be provided.

The provincial and federal governments have not completed an inventory of the location, extent and nature of areas supporting the remains of Alberta's native ecosystems. Some work has been done on a piecemeal basis, for example, Environmentally Significant Areas studies by regional planning commissions, municipalities and Forestry, Lands and Wildlife. Integrated land use plans have identified other areas. Some reconnaissance has been done by Natural and Protected Areas and provincial parks. Nongovernment organizations have also compiled lists of sites considered representative and warranting protection. The Alberta Wilderness Association has listed 65 sites needing formal protection, 15 of international significance, six of national, 26 of provincial and 14 of regional significance (Pachal 1992). The Prairie Conservation Action Plan has identified 10 sites in and around which large representative areas should be protected (Pachal 1992). Completing a provincial inventory is an important and necessary step in putting a protection system in place. The areas supporting remnants of natural ecosystems—large and small, in various stages of succession and human domination must be documented.

The Grassland and Parkland natural regions have far fewer tracts of native habitat left than any other part of Alberta. Estimates range from 1% for Northern Fescue Grassland to as much as 25% for Central Parkland. Protection mechanisms were not in place at the time that these areas were initially developed for agriculture and oil, gas, coal or urban development. In many of these areas, restoration planning is the only way to ensure that adequate representation is achieved.

The Foothills Natural Region and the Mixedwood subregion of the Boreal Forest harbour a wealth of natural resources including coniferous forests in the Foothills and various forest combinations in the Mixedwood Boreal Forest; oil, gas, coal and other minerals; and rivers, suitable for hydropower development. The extent of areas supporting remnants of native ecosystems is much higher, but little has been designated or reserved for protection in order to keep development options open. There has been little federal government involvement in designating protected areas in these parts of Alberta. Almost no ecosystem protection has been provided in the Canadian Shield, much of which remains in its indigenous state.

The most protected parts of the province are in the Rocky Mountains and the most northern boreal forest areas, both of which have difficult terrain, have historically not been extensively developed and for which federal mechanisms have been in place for a long time (Banff was Canada's first national park). But key areas for protecting ecological integrity are heavily developed in these areas, notably the montane valleys of Banff and Jasper national parks and Kananaskis Country.

Provincial mechanisms account for 15% of the land areas protected in Alberta, although Alberta is responsible for managing more than 60% of the province's land base. Only 0.5% (3,414 km^2) of the province has been earmarked for future protection (see Table 7-1). There are several areas whose status has been in limbo for some time, including provincial parks, natural areas and ecological reserves. These must be implemented as soon as possible.

Significant potential for protection rests with the reassignment of land uses on Alberta public lands. Swinnerton (1991:11) states that the potential contribution of these lands to heritage conservation and outdoor recreation is critical because of their close proximity to urban centres. They are islands in predominantly natural condition in an otherwise cultivated and developed environment.

According to Alberta government personnel, a significant amount of public land in the White Area (including the Peace River area) is used for grazing. About 3.4% of Alberta (22,500 km^2) is public land used for grazing, including 2,900 km^2 on grazing reserves (Alberta Forestry, Lands and Wildlife 1990). While some of these areas will be unsuitable for protection because they have already been significantly changed, others may be appropriate, due to light or no sustained use. Another 17, 337 km^2 is considered vacant, although much of it is open water.

At least within the White Area, it appears that a review of the existing dispositions on public lands and reassignment for protection purposes could contribute to the maintenance and protection of the ecological diversity of the Grassland and Parkland natural regions of Alberta. Innovative management contracts could sustain some level of domestic livestock use while restoring or enhancing natural diversity. Agricultural incentives and policies that encourage landowners to exploit the land to its maximum (e.g., production quotas, crop insurance) should also be examined (Van Tighem 1991: pers. comm.).

Because most of the White Area is privately owned, protection mechanisms involving private landowners will play a significant role in achieving ecosystem protection. This has already been recognized by several government, private and nongovernment agencies as evidenced by the recent introduction of habitat retention, enhancement and restoration projects in Alberta's Parkland and Grassland regions. These programs could serve to provide core or buffer protection for remnants of unaffected natural areas, but are chronically underfunded and lack long-term commitment or legal support (i.e., laws).

Stewart Hilts (1989:100) stresses the need for a variety of protection mechanisms:

> *We need, therefore, "a whole system of tools to protect land"—many of which leave land in private ownership.*

While efforts are already under way in Alberta's Grassland and Parkland to retrieve and reverse losses of natural diversity, another challenge faces agencies administering protection mechanisms in the Foothills and Mixedwood Boreal Forest: how to provide protection in existing and proposed forest management agreement (FMA) areas. These areas have not yet sustained the magnitude of loss experienced in the White Area, but almost no provision has been made for systematic and balanced maintenance and protection of the ecological diversity of these subregions. Although the Minister has the discretion to withdraw lands from an FMA area for purposes s/he deems appropriate, this rarely happens. (There are only four areas larger than 100 km² in the entire Foothills region and Mixedwood Boreal Forest combined.)

This situation is considered just as critical as that facing the Grassland and Parkland regions because little reconnaissance of these areas (especially the Mixedwood Boreal Forest) has been completed and decisions are being made on the basis of forest productivity, and local environmental and wildlife impact, not provincial or national significance. Few areas, and none of any great size, have been identified for protection within the FMA areas of Alberta. The operating ground rules established for timber harvesting are becoming more environmentally sensitive, but because of their local, "on-the-ground" nature, do not provide the extent or kind of protection needed to protect representative examples of the forest ecosystems, which are being destroyed. One avenue for protection untried to date, is direct action by the forestry companies involved, in response to local public demands to protect specific areas or sites.

Integrated resource plans (IRP) have for many years facilitated reasoned land use decisions based on a thorough inventory and public consultation process; so thorough that it has taken up to seven years to complete one plan. This process helps identify candidate protection areas, but it does not set provincial policy for an overall protection system. Pachal (1992) says that one of the shortfalls of the IRP process is that wilderness is not recognized as a resource. Swinnerton (1991) and Hummel (1989) have identified other problems with the multiple use concept, which forms the basis for integrated resource planning in Alberta. Hummel (1989: 273) summarizes:

> *At its best, the wise-use philosophy provides us with responsible tools for managing natural resources based on sound conservation principles. At its worst, it serves as an argument for developing every square centimetre of the planet.*

Much of the Green Area, which is considered most threatened by timber harvesting, has not yet been included in IRPs, although recent FMAs state that where an integrated resource plan has been completed, changes in timber harvesting plans may be required.

The completion of Environmentally Significant Area studies for new or proposed FMA areas, such as has been done for the almost 63,000-km² Alberta-Pacific FMA and the 7,000-km² Sunpine FMA, provide the government with a general indication of which areas should be considered for protection, before an FMA area is designated and the agreement signed. These studies would also help identify appropriate withdrawals, as provided for in the agreements (up to 3%). In other areas proposed for development "ecological SWAT teams" (Roberts 1991) could complete cursory assessments to help identify potential protection areas.

As mentioned above, the ideal protection system consists of a series of areas, large and small, supporting viable examples of Alberta's native ecosystems, preferably connected. Two kinds of protection would be afforded: general overall representation of the "typical" nature of indigenous ecosystems, and representation and protection of unique features or populations. A plan of action would ideally identify and protect large areas first, since they are the least common and most threatened. It would also place endangered habitats and species ahead of smaller and connecting areas.

The protection of Alberta's aquatic ecosystems must also be accommodated—riparian habitats are critically important and their protection should match that role. Derek Doyle calls rivers "the report card of civilization" (Van Tighem 1991: pers. comm.).

Chapter 8

Conclusions

1. The designation and protection of examples of Alberta's ecological diversity is inconsistent across the province, with representations ranging from less than 1% for most natural subregions to a high of 68%. Of the 65% of Alberta that comprises 12 of 17 natural subregions, less than 1% has been designated as protected areas.

Five of Alberta's 17 natural subregions are represented by sites totalling more than 10% of each subregion. These are the Subalpine, Alpine and Montane areas of the Rocky Mountains and the Hay River and Peace River Lowlands of the Boreal Forest. Less than 1% of the three prairie Grassland subregions, as well as the two subregions of the Foothills has protection status. Alberta's three Parkland types are represented by rates of between 0.3% and 6.9%.

Almost 45% of the largest natural subregion, the Mixedwood Boreal Forest, is included in existing or proposed forest management agreement areas and timber quota and licence areas. Yet this subregion has less than 1% formally designated to represent its diverse indigenous ecosystems (Westworth 1990).

The importance of designating and maintaining a system of protected areas that represents the complete range of natural diversity has been stated by many agencies and researchers (Swinnerton 1991; IUCN 1980, Webb 1987), and for several decades.

2. Many designated protected areas are not afforded the protection they are legally supposed to have.

The protection status of existing areas varies, even among those of the same designation.

These shortfalls occur at all levels of administration, including: lack of initiative to act on the legislation (for example, Ministerial discretion to change or terminate long-standing dispositions); lack of regulations; absence of management plans and insufficient support for research, monitoring and enforcement in designated areas. For example, regulations must be developed immediately for ecological reserves. Management plans must be completed for many sites or types of sites, including Willmore Wilderness Park, conservation natural areas, provincial parks, the three wilderness areas, ecological reserves, habitat development areas, wildlife sanctuaries, migratory bird sanctuaries and Bighorn and Wild Kakwa wildland recreation areas.

Developments such as towns, roads, facility nodes and campgrounds in the ecologically critical montane areas of Banff and Jasper national parks and Kananaskis Country must be controlled.

In addition, governments must provide adequate trained staff to coordinate monitoring and research in Alberta's protected areas. Alberta has passed the point where "no management" means good or adequate management for Alberta's protected areas.

3. A coordinated, comprehensive provincial action plan is required.

In Alberta, as elsewhere, we are far beyond the time when protection by default will safeguard for the future, ecosystems where humans do not dominate life processes. "Whatever is left over" has already left many parts of this province, country and the world with only small remnants of once dynamic ecosystems. Peterson and Peterson (1991: 18) point to the growing need for planning:

> *... it is evident that there is now a strong desire to make protected area establishment something more than a chance process....*

What is needed is a strong, long-term protection and conservation strategy that ensures adequate representation of the natural diversity of each of the 17 natural subregions, including representation of different natural landscape themes. Pachal (1992) reports that Alberta Tourism, Parks and Recreation has acknowledged its role to advocate, research, educate and manage for the completion of a system that protects Alberta's natural heritage, including ecological reserves and wilderness areas.

A comprehensive inventory of the location, extent and nature of remaining examples of Alberta's ecological diversity and their protection status must be completed. Where large tracts of public land are being assigned for long-term use, cursory inventories must be completed and used to identify areas that will be protected from development. Moratoria on development should also be considered until inventories are completed. The potential for designation of appropriate areas in the White Area must be quickly assessed, particularly in light of the potential transfer of public lands with agricultural dispositions from Public Lands Division to Alberta Agriculture. Large areas threatened by development must also be a high priority (Webb 1987).

A provincial protection strategy should be developed that will ensure each subregion has a continuum of (preferably connected) areas supporting diverse natural communities, from small, local sites to large, more remote "wild" areas. Representation must be increased in those regions currently poorly represented. Through discussion among government agencies, nongovernment groups and the public, the level of representation and the mechanisms to best meet protection objectives should be determined.

4. There is an urgency to complete an inventory and implement an action plan to avoid irreversible, large-scale losses as have occurred in the past.

Such a strategy was not in place as Alberta's Grassland and Parkland regions were being developed. Now efforts in these natural regions are directed toward retaining what little is left and attempting to restore, through active development, other areas. The opportunity to avoid such scale of loss in Alberta's Foothills and Mixedwood Boreal Forest is rapidly diminishing. No protection strategy is in place for the Canadian Shield, which has little development pressure but also very little protected.

5. It is recognized that protection of representative examples of Alberta's ecological diversity will be achieved through a variety of mechanisms and with different degrees of protection status.

The mechanisms described in this report all contribute to the maintenance and protection of Alberta's ecological diversity, either directly through preventing human domination of natural areas, or indirectly, by concentrating human activity away from areas warranting protection. A range of areas supporting samples of native ecosystems, from those minimally disrupted by people to those highly developed, must be found in each subregion.

A system of protected areas in the Grassland and Parkland will involve cooperative programs with private landowners. The level of protection may be different than for other parts of Alberta because there are few large wild areas left and human development of these regions is extensive. Significant protection and restoration may be achieved by amending existing agricultural and economic policies that force farmers to exploit extensive areas.

Protection to achieve better overall representation will likely involve legislated mechanisms described in this report, as well as other methods.

Opportunities to provide protection could also involve reallocation of land uses on Alberta public lands, such as in forest management agreement areas and for lands leased for grazing in the White Area, as well as adjustments to current operating ground rules and terms and conditions of leases.

6. Albertans deserve Alberta in the future.

> *Albertans deserve the right to a healthy and diverse environment wherein the natural, endemic landscapes, wildlife and living systems that, after all, are Alberta, are maintained. The frontier era is past and the future is imminent. If Albertans of the future are to know who they are, they must be able to live and work and raise families in a place they can recognize and know as Alberta. This will not and cannot happen by default, given today's trends in landscape change, resource exploitation and population growth. It can only happen through responsible, enlightened and visionary planning (Van Tighem 1991: pers. comm.).*

7. Alberta has a global responsibility to manage and protect representative examples of its native ecosystems.

We must recognize that the remains of Alberta's native ecosystems not only locally support life, but are part of the global ecosphere that supports all life on this planet. The earth is showing signs of serious deterioration, and everyone has a responsibility to future generations to safeguard earth's environmental health. Without adequate and healthy support systems, all life is threatened.

No longer do the economic and material gains from consuming earth's resources at increasing rates outweigh environmental and life consequences. It is no longer a matter of developers demanding of conservationists how much they will settle for. Instead, everyone must embrace a new environmental responsibility.

The onus is on the developer to prove that his proposed change in land use will not jeopardize local and regional ecosystems (Rowe 1990 6: 5).

There are positive, proactive measures governments can take to help the planet sustain and heal itself (see also Ehrlich and Wilson 1991; Mann 1991; Soule 1991). Maintaining and protecting areas that support viable samples of native ecosystems is a significant contribution to meeting that goal.

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— Chapter F-14. *Forest and Prairie Protection Act*.

— Chapter F-15. *Forest Reserves Act*.

— Chapter F-16. *Forests Act*.

— Chapter H-8. *Historical Resources Act*.

— Chapter L-19. *Litter Act*.

— Chapter M-15. *Mines and Minerals Act*.

— Chapter P-9. *Planning Act*.

— Chapter P-22. *Provincial Parks Act*.

— Chapter P-30. *Public Lands Actt*.

— Chapter W-5. *Water Resources Act*.

— Chapter W-8. *Wilderness Areas, Ecological Reserves and Natural Areas Act*.

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For Further Information

Alberta Government Mechanisms

Alberta Forestry, Lands and Wildlife

Eastern Slopes Policy (also Integrated Resource Plans):

Resource Planning Branch
Public Lands Division
Alberta Forestry, Lands and Wildlife
9942 - 108 Street
Edmonton, Alberta
T5K 2J5
(403) 427-3608
Dial 0: Zenith 22289

Forest Land Use Zones (also Forest Recreation Areas, Wildland Recreation Areas, Willmore Wilderness Park):

Recreation Section, Forest Land Use Branch
Alberta Forest Service Division
Alberta Forestry, Lands and Wildlife
9920 - 108 Street
Edmonton, Alberta T5K 2M4
(403) 427-3583

Forest Management Agreements:

Timber Management Branch
Alberta Forest Service Division
Alberta Forestry, Lands and Wildlife
9920 - 108 Street
Edmonton, Alberta T5K 2M4
(403) 427-8441

Forest Recreation Areas - see Forest Land Use Zones, above

Integrated Land Use Plans - see Eastern Slopes Policy, above

Land Status Automated System (LSAS) (public land reservations):

Program Support Branch
Public Lands Division
Alberta Forestry, Lands and Wildlife
9915 - 108 Street
Edmonton, Alberta T5K 2C9
(403) 427-3566

Natural Areas:

Natural and Protected Areas Section
Land Management Branch
Public Lands Division
Alberta Forestry, Lands and Wildlife
9915 - 108 Street
Edmonton, Alberta T5K 2C9
(403) 427-5209

Wildlife Habitat Areas and Programs (also Provincial Wildlife Sanctuaries, Habitat Development Areas):

Fish and Wildlife Division
Alberta Forestry, Lands and Wildlife
9920 -108 Street
Edmonton, Alberta T5K 2M4

Provincial Wildlife Sanctuaries and Habitat Development Areas: (403) 427-9506
Habitat programs: (403) 427-9506
Wildlife management: (403) 427-6750
Hunting and fishing regulations: (403) 427-6750

Sanctuaries for Wildlife - see Wildlife Habitat Areas and Programs, above
Wildland Recreation Areas - see Forest Land Use Zones, above
Willmore Wilderness Park - see Forest Land Use Zones, above

Alberta Tourism, Parks and Recreation

Ecological Reserves (also Provincial Parks, Provincial Recreation Areas, Wilderness Areas):
Provincial Parks Service
Alberta Tourism, Parks and Recreation
Standard Life Centre
10405 Jasper Avenue
Edmonton, Alberta T5J 3N4
(403) 427-7009

Kananaskis Country:
Alberta Tourism, Parks and Recreation
100, 1011 - Glenmore Trail S.W.
Calgary, Alberta T2J 4R6
(403) 297-3362

Provincial Parks - see Ecological Reserves, above
Provincial Recreation Area - see Ecological Reserves, above
Wilderness Areas - see Ecological Reserves, above

Alberta Environment

Water Resources Act:
Water Resources Administration Division
Alberta Environment
2nd floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta T5K 2J6
(403) 427-6168

Restricted Development Areas:
Land Use Branch
Environmental Assessment Division
Alberta Environment
6th floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta T5K 2J6
(403) 422-2540

Alberta Culture and Multiculturalism

Historic Sites and Archives
Historical Resources Division
Alberta Culture and Multiculturalism
Old St. Stephen's College
8820 - 112 Street
Edmonton, Alberta T6G 2P8
(403) 431-2310

Alberta Municipal Affairs

Planning Services Division
12th floor, 10155 - 102 Street
Edmonton, Alberta T5J 4L4
(403) 427-3181

Federal Government Mechanisms

Canadian Heritage Rivers (also National Parks, Cooperative Heritage Sites, Biosphere Reserves, World Heritage Sites):
Parks Service, Western Region
Environment Canada
P.O. Box 2989, Station M
Calgary, Alberta T2P 3H8
(403) 292-4747

Cooperative Heritage Sites - see Canadian Heritage Rivers, above

Migratory Bird Sanctuaries (also National Wildlife Areas, Ramsar Sites):
Canadian Wildlife Service
Environment Canada
2nd floor, 4999 - 98 Avenue
Edmonton, Alberta T6B 2X3
(403) 468-8919

National Parks - see Canadian Heritage Rivers, above
National Wildlife Areas - see Migratory Bird Sanctuaries, above

International Protection Mechanisms

Biosphere Reserves - see Canadian Heritage Rivers, above
Ramsar Sites: see Migratory Bird Sanctuaries, above
World Heritage Sites: - see Canadian Heritage Rivers, above

Government Publications

Alberta Forestry, Lands and Wildlife
Information Centre
Main Floor, Bramalea Building
9920 - 108 Street
Edmonton, Alberta T5K 2M4
Telephone: (403) 427-3590

Alberta Forestry, Lands and Wildlife
Information Centre
Main Floor, Britannia Building
703 - 6 Avenue S.W.
Calgary, Alberta T2P 0T9
Telephone: (403) 297-6324

Alberta Statutes and Regulations
  Queen's Printer Bookstore
  Main Floor, McDougall Centre
  455 - 6th St. S.W.
  Calgary, Alberta T2P 4E8
  (403) 297-6251
  Queen's Printer Bookstore
  11510 Kingsway Avenue
  Edmonton, Alberta T5G 2Y5
  (403) 427-4952

Environmental Advocacy
(selected organizations)

Alberta Environmental Network
10511 Saskatchewan Drive
Edmonton, Alberta T6E 4S1
(403) 433-9302

Alberta Fish and Game Association
6924 - 104 Street
Edmonton, Alberta T6H 2L7
(403) 437-2342

Alberta Forestry Association
Alberta Block, Suite 101
10526 Jasper Avenue
Edmonton, Alberta T5J 1Z7
(403) 428-7582

Alberta Wilderness Association
Box 6398, Station D
Calgary, Alberta T2P 2E1
(403) 283-2025
Alberta Wilderness Association
Edmonton Chapter
10511 Saskatchewan Drive
Edmonton, Alberta T6E 4S1
(403) 439-0648

Canadian Parks and Wilderness Society
Alberta Chapter
11759 Groat Road
Edmonton, Alberta T5M 3K6
(403) 453-8658

Canadian Society of Environmental Biologists
Alberta Chapter
P. O. Box 9567
Edmonton, Alberta T6E 5X2
(403) 434-4179

Canadian Water Resources Association
Alberta Branch
c/o WEIR Engineering
2735 - 39th Avenue
Calgary, Alberta T1Y 4T8
(403) 291-1195

Environment and Outdoor Education Council
Alberta Teachers' Association
11010 - 142 Street
Edmonton, Alberta T5N 2R1
(403) 455-0674

Environmental Law Centre
10110 - 124 Street, Suite 202
Edmonton, Alberta T5N 1P6
1-800-661-4238 (local: 482-4891)

Environmental Resource Centre
10511 Saskatchewan Drive
Edmonton, Alberta T6E 4S1
(403) 433-4808

Federation of Alberta Naturalists
Box 1472
Edmonton, Alberta T5J 2N5
(403) 453-8629

Prairie Conservation Coordinating Committee
Bag 3014, Sun Centre Building
530 - 8th Street S.
Lethbridge, Alberta T1J 4C7
(403) 381-5430

Sierra Club of Western Canada (Alberta Group)
Box 61107
Kingston Postal Outlet
Calgary, Alberta T2N 4S6
(403) 244-4487

Trout Unlimited Canada
Box 6270, Station D
Calgary, Alberta T2P 2C8
(403) 221-8360

Appendix A

Ecosystem Classification

Canada's Natural Regions

The National Park Natural Regions classification is based on physiographic regions with relatively homogeneous physical geography in combination with ecological, geographical and geological information. Natural regions are defined as "natural landscapes and/or environments of Canada which may be separated from other such landscapes and environments by surface features which are readily observable, discernible and understandable by the general public as well as those familiar with the natural features of Canada (Indian and Northern Affairs 1972: 3).

At the national level, 39 natural regions have been identified and are grouped into eight broader geographical regions (Figure A-1). Representations of six natural regions are found in Alberta: Rocky Mountains, Northern Boreal Plains, Southern Boreal Plains and Plateaux, Prairie Grasslands, Northwestern Boreal Uplands and Central Boreal Uplands. Environment Canada has also identified Marine Natural Regions on each of the three seacoasts of Canada—none are found in Alberta.

The National Park Natural Regions classification system is too broad to reflect the variability in landscape at the provincial scale. Alberta's departments of Tourism, Parks and Recreation and Forestry, Lands and Wildlife use more detailed systems to guide their work. Alberta Tourism, Parks and Recreation uses the Natural Regions system described in Chapter 2 of this report. The ecoregion system used by Forestry, Lands and Wildlife is discussed below.

Ecoregions of Alberta

Alberta Forestry, Lands and Wildlife (formerly part of Alberta Energy and Natural Resources) uses an ecological land classification system based on ecoregions rather than natural regions for land management planning. An ecoregion is defined as an ecological system found in a given land area. In practice it represents a naturally occurring assemblage of plants and animals that characterizes the landscape of a large geographical area. Alberta's ecoregions (Figure A-2) are distinguished primarily on the basis of climate with consideration of natural vegetation and soils. In addition to being an ecosystem-based classification system, it is used to evaluate how suitable the climate in various parts of the province is for land use activities (Strong and Leggatt 1981).

The province is divided into 12 ecoregions that range in area from 0.5% to 43.2% of the province. The areal extent of the 12 regions is summarized in Table A-1.

Comparison of Ecological Classification Systems

The maps of the natural regions of Canada and Alberta and of Alberta's ecoregions reveal many similarities among the three ecological classification systems. The correspondence among the three systems is summarized in Table A-2.

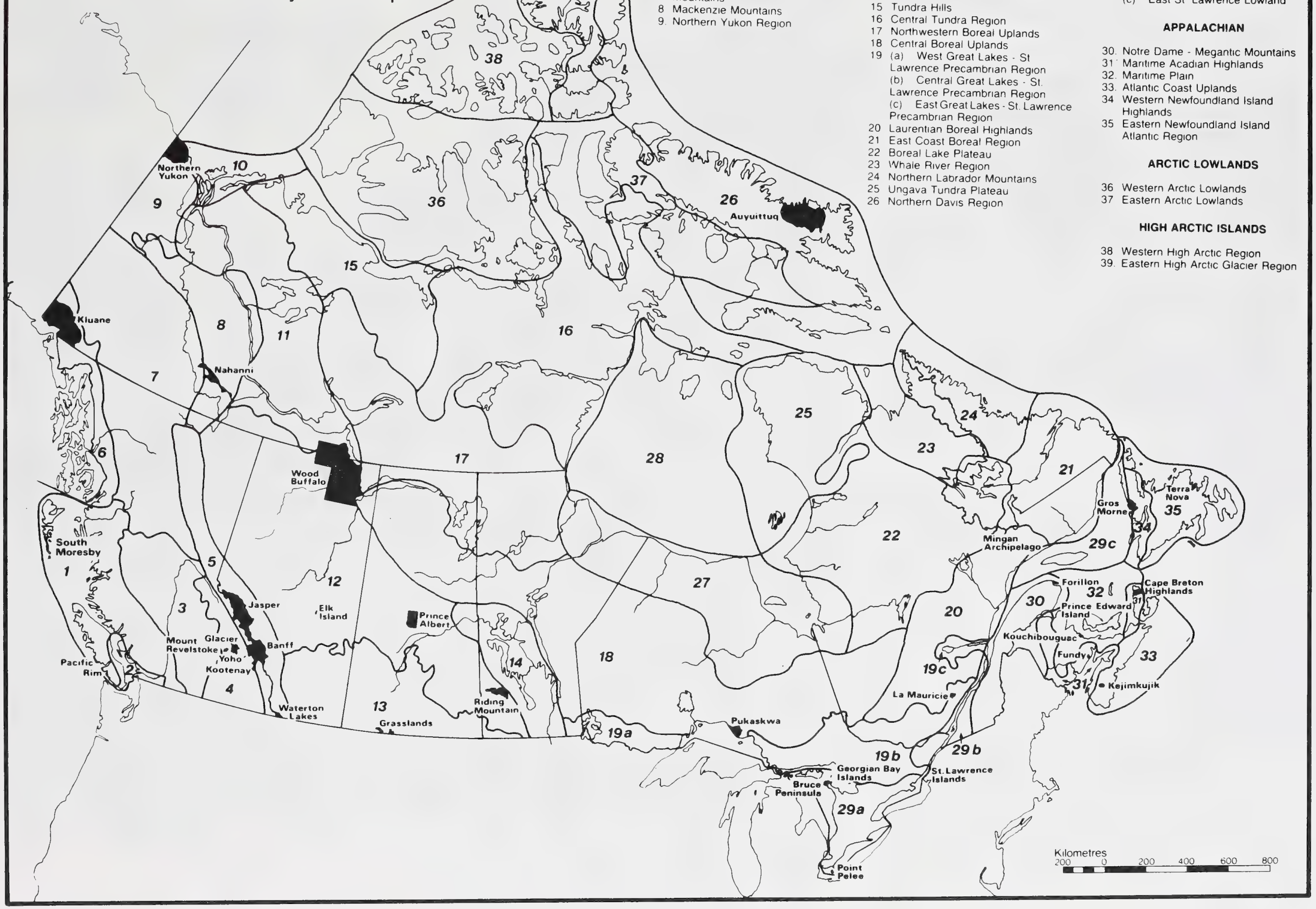
Land Use Capability Mapping

These classification systems provide maps of natural resources on an ecologically descriptive basis. Other systems classify and map land on a land capability basis, based on an evaluation of land to sustain a particular use (Dept. Regional Economic Expansion 1970).

The best known land capability and use survey in Canada is the Canada Land Inventory (CLI). This program for land and resource planning was initiated in the 1960s as a result of increasing regional economic disparity, improper land use and resource and

Figure A-1 National Park Natural Regions

SOURCE: National Parks Systems Report



WESTERN MOUNTAINS

1 Pacific Coast Mountains
2 Strait of Georgia Lowlands
3 Interior Dry Plateau
4 Columbia Mountains
5 Rocky Mountains
6 Northern Coast Mountains
7 Northern Interior Plateaux and Mountains
8 Mackenzie Mountains
9. Northern Yukon Region

INTERIOR PLAINS

10. Mackenzie Delta
11 Northern Boreal Plains
12. Southern Boreal Plains and Plateaux
13. Prairie Grasslands
14 Manitoba Lowlands

CANADIAN SHIELD

15 Tundra Hills
16 Central Tundra Region
17 Northwestern Boreal Uplands
18 Central Boreal Uplands
19 (a) West Great Lakes - St Lawrence Precambrian Region
(b) Central Great Lakes - St. Lawrence Precambrian Region
(c) East Great Lakes - St. Lawrence Precambrian Region
20 Laurentian Boreal Highlands
21 East Coast Boreal Region
22 Boreal Lake Plateau
23 Whale River Region
24 Northern Labrador Mountains
25 Ungava Tundra Plateau
26 Northern Davis Region

HUDSON BAY LOWLANDS

27. Hudson-James Lowlands
28. Southampton Plain

ST. LAWRENCE LOWLANDS

29. (a) West St. Lawrence Lowland
(b) Central St. Lawrence Lowland
(c) East St Lawrence Lowland

APPALACHIAN

30. Notre Dame - Megantic Mountains
31 Maritime Acadian Highlands
32. Maritime Plain
33. Atlantic Coast Uplands
34 Western Newfoundland Island Highlands
35 Eastern Newfoundland Island Atlantic Region

ARCTIC LOWLANDS

36 Western Arctic Lowlands
37 Eastern Arctic Lowlands

HIGH ARCTIC ISLANDS

38 Western High Arctic Region
39. Eastern High Arctic Glacier Region

Table A-1
The Ecoregions of Alberta

Ecoregion	Number	Area (km²)	% Area
Short Grass	1	47,000	7.1
Mixed Grass	2	31,100	4.7
Fescue Grass	3	14,400	2.2
Aspen Parkland	4	73,300	11.1
Montane	5	3,500	0.5
Subalpine	6	23,100	3.5
Alpine	7	18,500	2.8
Boreal Mixedwood	8	285,600	43.2
Boreal Foothills	9	63,400	9.6
Boreal Uplands	10	27,100	4.1
Boreal Northlands	11	47,600	7.2
Boreal Subarctic	12	26,400	4.0
TOTAL		**660,900**	**100.0**

land use conflicts in the provinces (Rees 1977). The goal of CLI was to help correct inappropriate land uses. Settled portions of rural Canada and adjacent areas were assessed for their physical capability for use in agriculture, forestry, recreation and wildlife production on a seven-scale system ranging from high capability to negligible or no capability. The maps were general, not intended for site-specific planning. CLI has limited use. It provides "independent, static representations of an only more or less objective assessment of the land resource for a single purpose at a particular point in time" (Rees 1977: 17). CLI is used only at a preliminary general level in land use planning.

Table A-2
Comparison of Natural and Ecoregions of Alberta, and Natural Regions of Canada

Natural Region (Alta. Trsm, Parks & Rec.)	Ecoregion (Alta. Forestry., Lnds & Wilfe.)	Natural Region (Env. Canada)
Grassland	Short Grass Mixed Grass Fescue Grass	Prairie Grassland
Parkland	Aspen Parkland	Southern Boreal Plains & Plateaux
Foothills	Boreal Foothills Boreal Uplands	Rocky Mountains
Boreal Forest	Boreal Mixedwood Boreal Northlands Boreal Subarctic	Southern Boreal Plains & Plateaux Northern Boreal Plains
Rocky Mountains	Montane Subalpine Alpine	Rocky Mountains
Canadian Shield	Boreal Northlands Boreal Mixedwood	Northwestern Boreal Uplands Central Boreal Uplands

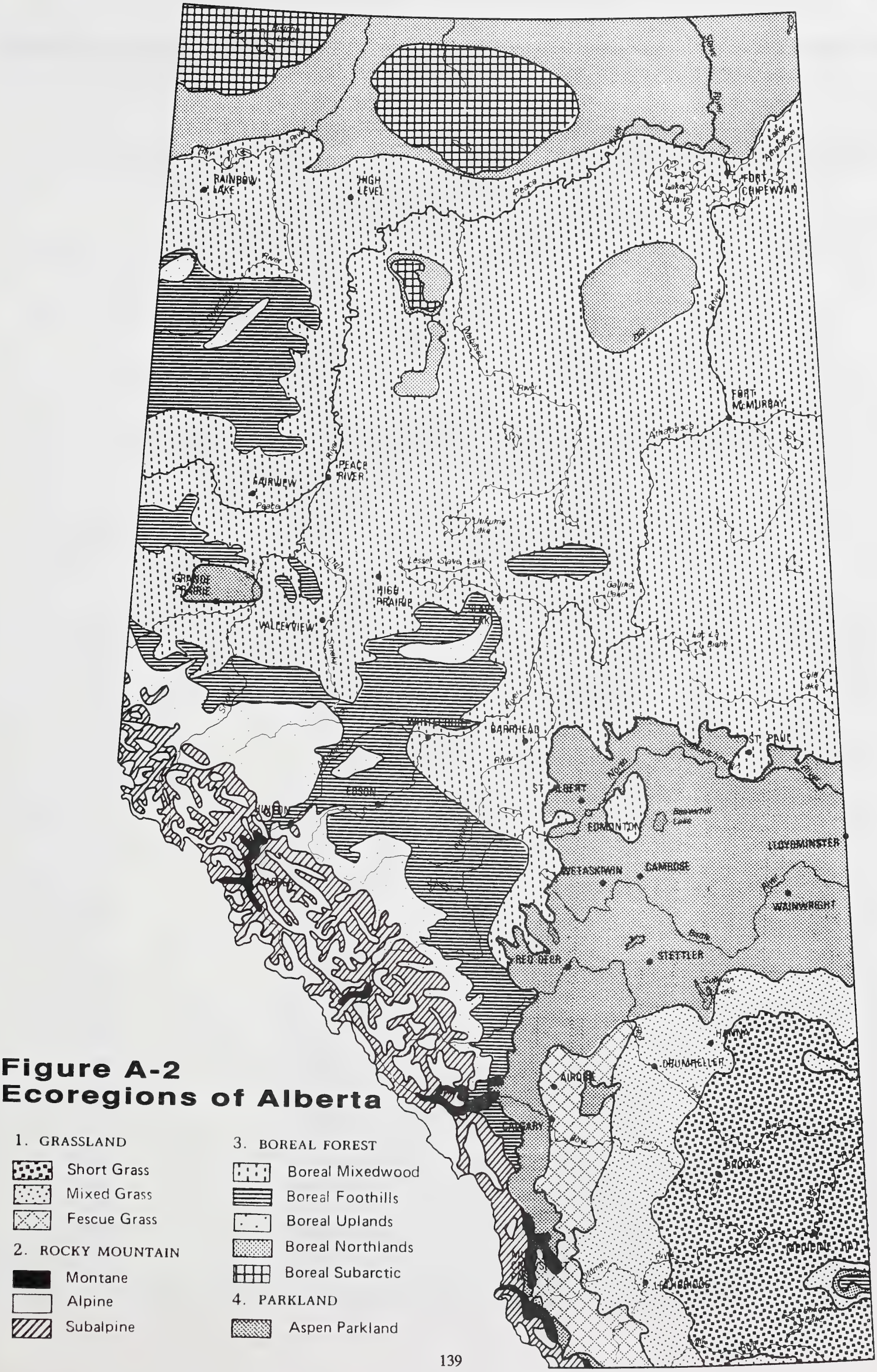


Figure A-2
Ecoregions of Alberta

Appendix B

Data Appendix, by Natural Region

Table B-1
Natural Areas in Alberta, by Natural Region (listed according to size, from smallest to largest)
Source: Natural Areas Program, Public Lands Division, Alberta Forestry, Lands and Wildlife

Natural Region & Subregion	Area Name CNA = Conservation Natural Area ENA = Educational Natural Area RNA = Recreational Natural Area	Size (km^2)	Type
Grassland			
Mixed			
GM	Red Rock Coulee	3.24	CNA
GM	Milk River	54.9	CNA
Northern Fescue			
GNF	Highwood River	0.10	RNA
Parkland			
Central			
PC	Antler Lake Island	0.01	CNA
PC	Delburne	0.11	CNA
PC	Sylvan Lake	0.11	RNA
PC	Big Valley	0.13	RNA
PC	Wood Lake	0.24	CNA
PC	Markerville	0.32	RNA
PC	Heatburg	0.32	RNA
PC	Genesee	0.55	ENA
PC	Battle Creek	0.63	CNA
PC	Sherwood Park	0.63	ENA
PC	Innisfail	0.64	ENA
PC	Gadsby Lake	0.65	CNA
PC	Magee Lake	0.65	CNA
PC	Thorsby	0.65	CNA
PC	Hoadley	0.65	CNA
PC	Parkland	0.65	ENA
PC	Battle Lake	0.65	RNA
PC	Lousana	0.90	CNA
PC	North Cooking Lake	0.91	RNA
PC	Riverlot 56	1.08	RNA
PC	Alsike Bat Lake	1.15	ENA

Table B-1 (continued)
Natural Areas in Alberta, by Natural Region

Natural Region & Subregion	Area Name CNA = Conservation Natural Area ENA = Educational Natural Area RNA = Recreational Natural Area	Size (km^2)	Type
Parkland			
Central			
PC	Wagner	1.25	ENA
PC	Collett	2.43	ENA
PC	Coyote Lake	2.57	CNA
PC	Beaverhill Lake	4.10	CNA
Foothills			
PF	Outpost Wetlands	0.72	CNA
Peace River			
PPR	Kleskun Hill	0.62	ENA
PPR	Caribou River	1.95	CNA
PPR	Fourth Creek	9.10	CNA
Foothills			
Main			
FM	Mill Island	0.79	CNA
FM	McGregor Lake	9.23	CNA
FM	Scalp Creek	3.23	CNA
FM	Cow Lake	3.98	RNA
FM	Clearwater Ricinus	0.57	RNA
FM	Sheep Creek	0.05	RNA
Boreal Forest			
Mixedwood			
BFMW	Red Deer River	0.03	CNA
BFMW	Murray Island	0.10	CNA
BFMW	Sundre North	0.10	RNA
BFMW	Sundre Red Deer	0.13	RNA
BFMW	Schrader Creek	0.14	CNA
BFMW	Victoria Settlement	0.14	RNA
BFMW	Sturgeon Lake	0.28	RNA
BFMW	Bearberry Prairie	0.29	RNA
BFMW	Taylor Lake	0.41	CNA
BFMW	Sundre	0.47	RNA
BFMW	Mystery Lake	0.49	CNA
BFMW	Threepoint Creek	0.52	CNA
BFMW	Snakes Head	0.54	RNA
BFMW	Dussault Lake	0.56	RNA
BFMW	St. Francis	0.61	RNA
BFMW	Bellis	0.62	RNA
BFMW	Kakina Lake	0.64	CNA
BFMW	Welch Creek	0.64	CNA
BFMW	Paddle River	0.64	CNA
BFMW	Open Creek	0.65	ENA
BFMW	Bigoray	0.65	RNA
BFMW	Redwater River	0.65	RNA
BFMW	Crippsdale	0.65	RNA
BFMW	Rocky Rapids	0.65	RNA

Table B-1 (continued)
Natural Areas in Alberta, by Natural Region

Natural Region & Subregion	Area Name CNA = Conservation Natural Area ENA = Educational Natural Area RNA = Recreational Natural Area	Size (km²)	Type
Boreal Forest			
Mixedwood			
BFMW	Carnwood Modeste	0.65	RNA
BFMW	Pembina River	0.80	CNA
BFMW	Clear Lake	0.91	RNA
BFMW	Bear Lake	0.94	CNA
BFMW	Pembina River Moon Lake	1.06	CNA
BFMW	Buck Lake	1.10	CNA
BFMW	Easyford Creek	1.13	CNA
BFMW	Easyford	1.13	CNA
BFMW	Washout Creek	1.22	CNA
BFMW	Bilby	1.25	ENA
BFMW	Isle Lake	1.26	RNA
BFMW	Round Valley	1.28	RNA
BFMW	Halfway Lake	1.28	RNA
BFMW	George Lake	1.29	ENA
BFMW	Buck Lake Creek	1.30	CNA
BFMW	Majeau Lake	1.30	CNA
BFMW	Astotin	1.30	CNA
BFMW	Sundance	1.30	RNA
BFMW	Park Court	1.43	CNA
BFMW	Lily Lake	1.72	ENA
BFMW	North Bruderheim	1.78	ENA
BFMW	Prefontaine Brock Lakes	1.89	CNA
BFMW	Anderson Creek	1.94	CNA
BFMW	Butcher Creek	2.05	RNA
BFMW	Chedderville	2.33	RNA
BFMW	Pembina Field	2.50	RNA
BFMW	Roselea	2.55	RNA
BFMW	Saulteaux	2.59	ENA
BFMW	Otauwau	2.59	ENA
BFMW	Highway	2.60	CNA
BFMW	North Saskatchewan	2.69	CNA
BFMW	La Saline	2.92	CNA
BFMW	Matthews Crossing	3.11	RNA
BFMW	Horseshoe Creek	3.24	CNA
BFMW	Poplar Creek	3.24	CNA
BFMW	Burtonsville Island	3.28	ENA
BFMW	Halfmoon Lake	3.31	RNA
BFMW	Police Point	3.70	RNA
BFMW	Opal	3.72	RNA
BFMW	Modeste Creek	3.86	CNA
BFMW	Northwest of Bruderheim	3.88	RNA
BFMW	Hondo	3.89	ENA
BFMW	Modeste Saskatchewan	4.03	CNA
BFMW	Washout Saskatchewan	4.29	RNA
BFMW	Lloyd Creek	5.58	CNA
BFMW	Drayton Valley	6.79	RNA

Table B-1 (continued)
Natural Areas in Alberta, by Natural Region

Natural Region & Subregion	Area Name CNA = Conservation Natural Area ENA = Educational Natural Area RNA = Recreational Natural Area	Size (km^2)	Type
Boreal Forest			
Mixedwood			
BFMW	Pine Sands	13.50	RNA
BFMW	Redwater	18.11	ENA
BFMW	White Earth Valley	20.55	CNA
Rocky Mountain			
Montane			
RRM	Wildcat	0.08	CNA
RRM	Ole Buck Mountain	3.57	CNA
RRM	Canmore Flats	5.77	ENA
Alpine-Subalpine			
RMSA	Plateau Mountain	1.30	CNA
RMSA	Emerson Creek	1.94	CNA
RMSA	Mount Livingstone	5.35	CNA
RMSA	Beehive	56.62	RNA

Table B-2
Seasonal Sanctuaries and Corridor Wildlife Sanctuaries in Alberta

Natural Region & Subregion	Area Name	Description	Type
Grassland			
Mixed			
GM	Pelican Island	island	SS
GM	Scope Reservoir	island	SS
Parkland			
Central			
PC	Beaverhill Lake	island	SS
Foothills			
Main			
FM	Elk Creek		CWS
FM	Hwy 40/Little Smoky/Simonette		CWS
FM	North Ram		CWS
FM	Ram Falls		CWS
FM	Sulphur Lake		CWS
FM	Whitemud Hills		CWS
FM	Ya Ha Tinda Ranch		CWS
Boreal Forest			
Mixedwood			
BFMW	Bissell/Weldwood		CWS
BFMW	Lower Therien Lake	island	SS
BFMW	Lower Therien Lake	portion of lake	SS
BFMW	Namur Lake	island	SS
BFMW	Peace River Pulp Mill/Sun Valley Ferry	CWS	
BFMW	Unnamed Lake	island	SS
BFMW	Wadlin Lake	island	SS
Rocky Mountain			
Montane			
RMM	Harold Creek		CWS
RMM	Highwood		CWS
RMM	Kootenay Plains		CWS

SS = Seasonal Sanctuary
CWS = Corridor Wildlife Sanctuary

Table B-3
Forest Land Use Zones in Alberta

Name and Location	Area (km^2)	Purpose	Restrictions
Natural Region	Year established		
Kananaskis Country -SW of Calgary -Rocky Mountain: Montane, Alpine & Subalpine -Foothills: Main	3153 (1979)	• prevents conflicts between motorized & nonmotorized recreational activities	• no camping & fires within 1 km of recreation areas, trails or roads • motorized use prohibited except on highways & within McLean Creek Off-Highway Vehicle & Sibbald Snow Vehicle Forest Land Use Zones
McLean Creek Off-Highway -Foothills: Main	205 (1979)	• provides area for off-highway vehicle use within Kananaskis Forest Land Use Zone	• operation of motor vehicles permitted unless otherwise posted
Sibbald Snow Vehicle -Foothills: Main	98 (1979)	• provides snowmobiling opportunities in the Sibbald area of Kananaskis Forest Land Use Zone	• operation of snow vehicles permitted unless otherwise posted
Cataract Creek Snow Vehicle -Rocky Mountain: Montane, Alpine & Subalpine	500 (1979)	• provides snowmobiling oppportunities in the Cataract Creek area of Kananaskis Forest Land Use Zone	• operation of snow vehicles permitted unless otherwise posted
Panther Corners -SW of Rocky Mountain House -Foothills: Main	192 (1985)	• protects environmentally sensitive backcountry area from adverse effects of motorized vehicle activity	• no motorized vehicles • no grazing or tethering of horses within 100 m of lakes or streams; horse users may have to provide own horse feed
Upper Clearwater -SW of Rocky Mountain House -Foothills: Main	639 (1985)	• protects environmentally sensitive backcountry from adverse effects of motorized vehicle activities	• no motorized vehicles • no grazing or tethering of horses within 100 m of lakes or streams; horse users may have to provide own horse feed

Table B-3 (continued)
Forest Land Use Zones in Alberta

Name and Location Natural Region	Area (km²) Year established	Purpose	Restrictions
Job Lake West of Nordegg Rocky Mountain: Alpine & Subalpine	41 (1985)	• protects environmentally sensitive backcountry from adverse effects of horse use & motorized vehicle activity	• no motorized vehicles • no grazing or tethering of horses within 100 m of lakes or streams; horse users may have to provide own horse feed
Blackstone-Wapiabi -W/NW of Nordegg -Rocky Mountain: Montane, Alpine & Subalpine	471 (1985)	• prevents severe over-use of critical wildlife area by horse users & motorized vehicle users, especially during calving season	• no motorized vehicles • no grazing or tethering of horses within 100 m of lakes or streams; horse users may have to provide own horse feed
Wild Kakwa -NW of Grande Cache -Rocky Mountain: Alpine & Subalpine	647 (1985)	• prevents severe over-use of critical wildlife area by horse users & motorized vehicle users, especially during calving season	• motorized vehicles permitted on designated trails only •vehicle access to Kakwa Falls parking area, 1 km from Falls
Allison/ Chinook -NW of Coleman -Rocky Mountain: Alpine & Subalpine	300 (1986)	• designates separate areas for motorized & nonmotorized recreational activities	• snowmobiling permitted on trails, as conditions permit (Dec.1 to Mar. 31) • off-highway vehicles permitted on designated trails (Apr 1 to Nov 30) primarily for hunting access • cross-country skiing allowed throughout zone • horesback riding allowed, except on cross-country trails during the winter

Table B-4
Forest Recreation Areas in Alberta, by Natural Region (listed according to size, from smallest to largest)

Natural Region & Subregion	Area Name	Size (km²)	Type
Parkland			
Peace River			
PPR	Ole's Lake	0.42	FRA
PPR	Hilltop Lake	0.72	FRA
PPR	Semo Lake	<1	FRA
Foothills			
Main			
FM	Gap Pond	0.01	FRA
FM	Mountain Park	0.01	FRA
FM	Struble Lake	0.02	FRA
FM	Atlas Road	0.03	FRA
FM	Coliseum	0.03	FRA
FM	Allison	0.04	FRA
FM	Carbondale	0.04	FRA
FM	Deer Creek	0.04	FRA
FM	Blackstone & Blackstone Viewpt.	0.04	FRA
FM	Steeper	0.05	FRA
FM	Wild Horse	0.06	FRA
FM	Southview	0.06	FRA
FM	Wild Hay River	0.08	FRA
FM	Kakwa River	0.08	FRA
FM	Aylmer	0.08	FRA
FM	Phyllis Lake	0.08	FRA
FM	Lambert Creek	0.09	FRA
FM	Coalspur	0.10	FRA
FM	Elk Creek Fish Pond	0.10	FRA
FM	Mitchell Lake	0.10	FRA
FM	Fairfax Lake	0.11	FRA
FM	Sheep Creek	0.11	FRA
FM	Eccles Pond	0.12	FRA
FM	Mason Creek	0.12	FRA
FM	South Ghost	0.13	FRA
FM	Pembina Forks	0.14	FRA
FM	Castle River Bridge	0.15	FRA
FM	Elk Creek	0.15	FRA
FM	Harlech	0.15	FRA
FM	Shunda Viewpoint	0.15	FRA
FM	Waiparous Valley	0.16	FRA
FM	North Ram River	0.16	FRA
FM	Dutch Creek	0.17	FRA
FM	Cutoff Creek	0.17	FRA
FM	Horburg	0.17	FRA
FM	Peppers Lake	0.18	FRA
FM	Westview	0.19	FRA
FM	McLeod River (auto, access & group)	0.21	FRA
FM	Syncline A&B, Syncline	0.21	FRA
FM	Swan Lake	0.22	FRA
FM	Lynx Creek	0.24	FRA
FM	Little Sundance Creek	0.24	FRA
FM	Weald	0.24	FRA

Table B-4 (continued)
Forest Recreation Areas in Alberta, by Natural Region
(listed according to size, from smallest to largest)

Natural Region & Subregion	Area Name	Size (km²)	Type
Foothills			
Main			
FM	James Wilson	0.25	FRA
FM	Brown Creek and Viewpoint	0.25	FRA
FM	Whitehorse Creek	0.30	FRA
FM	Cardinal River Divide	0.31	FRA
FM	Obed Lake	0.32	FRA
FM	South Fork	0.32	FRA
FM	Strachen	0.32	FRA
FM	Wolf Lake	0.32	FRA
FM	Racehorse Creek	0.33	FRA
FM	Ghost Airstrip	0.35	FRA
FM	Saunders	0.36	FRA
FM	Castle Falls	0.37	FRA
FM	Oldman River	0.37	FRA
FM	Watson Creek	0.38	FRA
FM	Seven Mile	0.40	FRA
FM	Prairie Creek	0.42	FRA
FM	Livingstone Falls	0.45	FRA
FM	Lovett River	0.46	FRA
FM	Upper Shunda Creek	0.47	FRA
FM	Cartier Creek	0.48	FRA
FM	Chinook Lake	0.48	FRA
FM	Burnt Timber	0.49	FRA
FM	Fallen Timber	0.55	FRA
FM	Shuttler Flats	0.59	FRA
FM	Beaverdam	0.59	FRA
FM	Little Sundance	0.64	FRA
FM	Bison Flats	0.65	FRA
FM	Running Lake	0.68	FRA
FM	Sulphur Lake	0.68	FRA
FM	Minnow Lake	0.76	FRA
FM	Ram Falls	0.96	FRA
FM	Pierre Grey's Lakes	1.00	FRA
FM	Smoke Lake	1.00	FRA
FM	Waiparous Creek	1.01	FRA
FM	Cardinal River	1.03	FRA
FM	Wildhorse Lake	1.04	FRA
FM	Athabasca Lookout Nordic Centre	1.06	FRA
FM	Big Berland	1.10	FRA
FM	Chambers Creek	1.15	FRA
FM	Beaver Mines Lake	1.19	FRA
FM	Red Deer River	1.19	FRA
FM	Fish Lake	1.21	FRA
FM	Stoney Lake	1.32	FRA
FM	North Ghost	1.44	FRA
FM	Emerson Lakes	1.52	FRA
FM	Musreau Lake	2.68	FRA
FM	Nose Lake	2.91	FRA
FM	Gunderson Meadows	15.54	FRA

Table B-4 (continued)
Forest Recreation Areas in Alberta, by Natural Region (listed according to size, from smallest to largest)

Natural Region & Subregion	**Area Name**	**Size (km^2)**	**Type**
Foothills			
Main			
FM	Beaver Creek	<1	FRA
FM	Hornbeck	<1	FRA
FM	Brazeau River	<1	FRA
FM	Cow Lake	<1	FRA
FM	Falls Creek	<1	FRA
FM	Jackfish Lake	<1	FRA
FM	Jackknife Springs	<1	FRA
FM	Medicine Lake	<1	FRA
FM	Fickle Lake	>1	FRA
FM	Brazeau Reservoir	>1	FRA
Northern Outliers			
FNO	Swan Hills	0.04	FRA
FNO	Edith Lake	0.05	FRA
FNO	Freeman River	0.11	FRA
FNO	Krause Lake	0.17	FRA
FNO	Buffalo Tower	0.21	FRA
FNO	Tall Creek Crossing	0.46	FRA
FNO	Chrystina Lake	<1	FRA
Boreal Forest			
Subarctic			
BFSA	Thurston Lake	0.28	FRA
Hay River			
BFHR	Watt Mountain Viewpoint	0.03	FRA
BFHR	Rainbow Lake Trout Pond	0.14	FRA
BFHR	Rainbow Lake	0.26	FRA
BFHR	Hutch Lake & Hutch Lk Viewpoint	0.58	FRA
BFHR	Buffalo River	<1.00	FRA
BFHR	Meander River	<1.00	FRA
BFHR	Steen River	<1.00	FRA
Peace River Lowlands			
BFPRL	Lawrence River	0.10	FRA
BFPRL	Richardson River	0.11	FRA
BFPRL	Sewinikun Creek	0.17	FRA
BFPRL	Dore Lake	0.70	FRA
Mixedwood			
BFMW	Christina River	0.01	FRA
BFMW	Engstrom	0.04	FRA
BFMW	Miseieutin	0.04	FRA
BFMW	Swan Lake	0.04	FRA
BFMW	Wandering River	0.04	FRA
BFMW	Wapiti River	0.05	FRA
BFMW	House River	0.05	FRA
BFMW	Sandhills	0.05	FRA
BFMW	Cascade Rapids	0.07	FRA
BFMW	Whitemud Falls	0.08	FRA
BFMW	Smoky River	0.08	FRA
BFMW	Calling River	0.08	FRA
BFMW	Big Mountain Creek	0.11	FRA

Table B-4 (continued)
Forest Recreation Areas in Alberta, by Natural Region (listed according to size, from smallest to largest)

Natural Region & Subregion	Area Name	Size (km²)	Type
Boreal Forest			
Mixedwood			
BFMW	Marianna Lakes	0.11	FRA
BFMW	Lawrence Lake	0.11	FRA
BFMW	Greentree	0.13	FRA
BFMW	Aspin House	0.15	FRA
BFMW	Machesis Lake	0.15	FRA
BFMW	Grovedale Fish Pond	0.15	FRA
BFMW	Big Horse	0.16	FRA
BFMW	Economy Lake	0.16	FRA
BFMW	Waskahigan	0.16	FRA
BFMW	Clausen's Landing	0.19	FRA
BFMW	Eagle River	0.19	FRA
BFMW	East Peerless Lake	0.21	FRA
BFMW	Cadotte/Peace	0.24	FRA
BFMW	Chain Lakes	0.24	FRA
BFMW	Grayling Creek	0.25	FRA
BFMW	Maqua Lake	0.25	FRA
BFMW	Simonette River	0.26	FRA
BFMW	Smoky Flats	0.28	FRA
BFMW	Wolf Lake	0.44	FRA
BFMW	West Fawcett	0.48	FRA
BFMW	Crow Lake	0.53	FRA
BFMW	Caribou Creek	0.65	FRA
BFMW	North Wabasca	0.74	FRA
BFMW	Tanasiuk	0.77	FRA
BFMW	Waskahigan River	2.39	FRA
BFMW	Iosegun Lake	2.57	FRA
BFMW	Engstrom Lake	<1	FRA
BFMW	Senex Creek	<1	FRA
Rocky Mountain			
Montane			
RMM	Goldeye Lake	0.29	FRA
RMM	Crescent Falls	0.32	FRA
RMM	Snow Creek	0.65	FRA
RMM	Kootenay Plains	1.08	FRA
RMM	Dry Haven Creek	<1	FRA
RMM	Siffleur Falls	<1	FRA
Alpine-Subalpine			
RMASA	Hummingbird	0.08	FRA
RMASA	Hell's Gate	0.24	FRA
RMASA	Thompson Creek	0.51	FRA
RMASA	Grande Cache (Blue Bridge)	1.01	FRA
RMASA	Pinto Lake	2.67	FRA
RMASA	Rock Lake	2.82	FRA
RMASA	Deadhorse Meadows	<1	FRA
RMASA	Kakwa Falls	<1	FRA
Canadian Shield			
Athabasca Plain			
CSAP	Bustard Island	0.08	FRA
CSAP	Six Lakes	0.16	FRA
CSAP	Pearson Lake	0.37	FRA

Table B-5
Provincial Parks in Alberta, by Natural Region (listed according to size, from smallest to largest)

Natural Region & Subregion	Area Name	Size (km^2)	Type
Grassland			
Mixed			
GM	Kinbrook Island	0.38	PP
GM	Taber	0.51	PP
GM	Little Fish Lake	0.61	PP
GM	Little Bow	1.10	PP
GM	Tillebrook	1.39	PP
GM	Park Lake	2.24	PP
GM	Writing-on-Stone	17.22	PP
GM	Dinosaur	66.22	PP
Northern Fescue			
GNF	Wyndham-Carseland	1.78	PP
GNF	Midland	5.95	PP
Foothills			
GF	Woolford	0.35	PP
GF	Willow Creek	1.09	PP
GF	Fish Creek (50%)	5.79	PP
GF	Cypress Hills (35%)	71.58	PP
Parkland			
Central			
PC	Ma-Me-O-Beach	0.02	PP
PC	Gooseberry Lake	0.52	PP
PC	Hasse Lake	0.69	PP
PC	Sylvan Lake	0.85	PP
PC	Jarvis Bay	0.86	PP
PC	Strathcona Science	1.09	PP
PC	Rochon Sands	1.15	PP
PC	Red Lodge	1.29	PP
PC	Aspen Beach	2.16	PP
PC	Big Knife	2.95	PP
PC	Pigeon Lake	4.43	PP
PC	Vermilion	7.71	PP
PC	Miquelon Lake	8.36	PP
PC	Dillberry Lake	9.55	PP
PC	Dry Island Buffalo Jump	11.80	PP
Foothills			
PF	Big Hill Springs	0.25	PP
PF	Police Outpost	2.23	PP
PF	Chain Lakes	4.09	PP
PF	Fish Creek (50%)	5.79	PP
Peace River			
PPR	O'Brien	0.65	PP
PPR	Twelve Foot Davis	0.85	PP
PPR	Queen Elizabeth	0.86	PP
PPR	Saskatoon Island	1.01	PP
Foothills			
Main			
FM	Bragg Creek	1.28	PP
FM	William A. Switzer	26.86	PP
FM	Crimson Lake	34.43	PP

Table B-5 (continued)
Provincial Parks in Alberta, by Natural Region (listed according to size, from smallest to largest)

Natural Region & Subregion	Area Name	Size (km²)	Type
Foothills			
Northern Outliers			
FNO	Lesser Slave Lake (40%)	30.23	PP
Boreal Forest			
Mixedwood			
BFMW	Williamson	0.17	PP
BFMW	Garner Lake	0.74	PP
BFMW	Pembina River	1.67	PP
BFMW	Thunder Lake	2.08	PP
BFMW	Wabamun Lake	2.29	PP
BFMW	Sir Winston Churchill	2.40	PP
BFMW	Cold Lake	3.98	PP
BFMW	Gregoire Lake	6.96	PP
BFMW	Moose Lake	7.35	PP
BFMW	Calling Lake	7.38	PP
BFMW	Long Lake	7.69	PP
BFMW	Moonshine Lake	8.47	PP
BFMW	Young's Point	10.90	PP
BFMW	Carson-Pegasus	11.77	PP
BFMW	Winagami Lake	12.11	PP
BFMW	Whitney Lakes	14.89	PP
BFMW	Cross Lake	20.76	PP
BFMW	Hilliard's Bay	23.29	PP
BFMW	Lesser Slave Lake (60%)	45.43	PP
BFMW	Notikewin	96.97	PP
BFMW	Lakeland	146.89	PP
Rocky Mountain			
Montane			
RMM	Beauvais Lake	7.61	PP
RMM	Bow Valley	12.61	PP
RMM	Cypress Hills (65%)	132.92	PP
Alpine-Subalpine			
RMASA	Peter Lougheed	501.42	PP

Table B-6
Provincial Recreation Areas in Alberta, by Natural Region (listed according to size, from smallest to largest)

Natural Region & Subregion	Area Name	Size (km²)	Type
Grassland			
Mixed			
GM	Chin Coulee	0.01	PRA
GM	Scandia	0.10	PRA
Northern Fescue			
GNF	Hoodoos	0.01	PRA
GNF	Bleriot Ferry	0.02	PRA
GNF	Horseshoe Canyon	0.04	PRA
GNF	Tolman Bridge	0.37	PRA
Foothills			
GF	Yarrow Creek	<0.01	PRA
GF	Castle River	0.04	PRA
Parkland			
Central			
PC	James River Bridge	0.01	PRA
PC	Raven	0.01	PRA
PC	Buffalo Lake	0.02	PRA
PC	Prospector's Point	0.43	PRA
PC	Sunhaven	0.02	PRA
PC	The Narrows	0.24	PRA
PC	Cooking Lake-Blackfoot	97.01	PRA
Peace River			
PPR	Dunvegan	0.02	PRA
PPR	Peace River	0.05	PRA
Foothills			
Main			
FM	Brown-Lowrey	2.78	PRA
FM	Fallen Timber	0.03	PRA
FM	Ghost Reservoir	0.03	PRA
FM	Tay River	0.02	PRA
FM	Twin Lakes	0.05	PRA
Boreal Forest			
Mixedwood			
BFMW	Ethel Lake	<0.01	PRA
BFMW	Manatokan	<0.01	PRA
BFMW	Missawawi	0.01	PRA
BFMW	Mitsue	0.01	PRA
BFMW	Moore Lake East	0.01	PRA
BFMW	Eastbourne	0.02	PRA
BFMW	Fork Lake	0.02	PRA
BFMW	Lesser Slave Lake	0.02	PRA
BFMW	Mallaig	0.02	PRA
BFMW	Moore Lake West	0.02	PRA
BFMW	Muriel Lake	0.02	PRA
BFMW	Nojack	0.03	PRA
BFMW	Kehiwin	0.04	PRA
BFMW	Assineau River	0.05	PRA
BFMW	Bear Trap Lake	0.06	PRA

Table B-6 (continued)
Provincial Recreation Areas in Alberta, by Natural Region (listed according to size, from smallest to largest)

Natural Region & Subregion	Area Name	Size (km²)	Type
Boreal Forest			
Mixedwood			
BFMW	Bonnie Lake	0.07	PRA
BFMW	Lower Mann Lake	0.07	PRA
BFMW	Franchere Bay	0.12	PRA
BFMW	Plamondon Beach	0.12	PRA
BFMW	Beaver Lake	0.15	PRA
BFMW	English Bay	0.18	PRA
BFMW	Floatingstone Lake	0.45	PRA
BFMW	North Buck Lake	1.11	PRA
BFMW	Calhoun Bay	3.47	PRA
BFMW	Frenchman's Bay	4.49	PRA
BFMW	Lakeland	440.89	PRA
Rocky Mountain			
Montane			
RMM	Lundbreck Falls	0.09	PRA

Table B-7
Protective Notations and Consultative Notations for Provincial Parks and Recreation Areas

Protective Notations
(Provincial Parks or Provincial Recreation Areas)

Site	Area* (km²)
1. Boss Hill	1.60
2. Bott Lake	1.23
3. Bow Island	0.49
4. Burnstick Lake	2.20
5. Cold Lake North Shore	51.80
6. Cold Lake South Shore	7.88
7. Elinor Lake	4.98
8. Fort Assiniboine Dunes	164.62
9. Fort Hills	23.30
10. Green Valley	3.70
11. Grouard Trail	44.00
12. Gull Lake	3.90
13. Lac Ste. Anne	2.80
14. Lawrence Lake	2.75
15. Leddy Ste. Germaine	9.77
16. Little Bow Reservoir	2.09
17. Marie Lake	0.45
18. Muriel Lake	1.38
19. North Buck Lake	14.03
20. Pioneer	41.45
21. Rumsey (south)	129.28
22. Sand Hill Lake	1.82
23. Wainwright Dunes (Wallaby Lake)	2.38
TOTAL	517.90

*estimates only

FROM: Memo from Kenneth Morrison, Alberta Recreation and Parks, November 8, 1991.

Table B-7
Protective Notations and Consultative Notations for Provincial Parks and Recreation Areas

Consultative Notations
(Provincial Parks or Provincial Recreation Areas)

Site	Area (km²)
1. Beaver Lake	3.89
2. Beaverdam-Paine	6.15
3. Castle River	419.60
4. Kootenay-Cline	536.15
5. North Porcupine Hills	102.30
6. Pinchurst-Touchwood	391.10
7. Sherman Meadows	15.55
8. Spring Lake	1.60
9. Wildhorse-Kinky Lakes	10.35
TOTAL	1486.69

*estimates only

FROM: Memo from Kenneth Morrison, Alberta Recreation and Parks, November 8, 1991.

Appendix C

Alberta's Ecological Reserves

The Ecological Reserves Program currently has 12 reserves designated by Order-in-Council (Alberta Recreation and Parks 1991: 6-8). These are:

1. Crow Lake

- established June 25, 1987.
- 9.38 km² in area.
- representative of the native ecosystems of the Mixedwood subregion of the Boreal Forest Natural Region including: upland spruce, pine and aspen forests; patterned fens, marshes and bogs.
- contains special features including: bald eagles, woodland caribou and rare plants.
- little evidence of human disturbance.

2. Goose Mountain

- established June 25, 1987.
- 12.46 km² in area.
- representative of the native ecosystems of the Northern Outliers subregion of the Foothills Natural Region including: colluvial slopes, bedrock ridges, fir-spruce-pine forests and tall shrub thickets.
- contains special features including: subxeric herb meadows, seepage areas and disjunct species.
- high uplands in the reserve were not glaciated during the last ice age.

3. Silver Valley

- established June 25, 1987.
- 18.05 km² in area.
- representative of the native ecosystems of the Peace River subregion of the Parkland Natural Region including: aspen forests, wild rye/shrub parkland and steep slope speargrass grasslands.
- contains special features including: rare and uncommon plants (e.g., *Stellaria crispa,* (species of chickweed), *Artemisia longifolia* (species of sagebrush), *Aster sibiricus*), slumps and drainage coulees.
- plant communities at Silver Valley are strongly influenced by the valley slopes of the Peace River and the numerous tributary creeks flowing through the area.
- a wildfire in 1936 burned most of the area.

4. Kootenay Plains

- established June 25, 1987.
- 32.04 km² in area.
- representative of the native ecosystems of the Montane subregion of the Rocky Mountain Natural Region including: *Agryopyron-Artemisia* (wheat grass and sagebrush) grasslands, white spruce-lodgepole pine forests and limber pine forests.
- contains special features including: calcareous fens, calcareous cliff habitats, rare plants (e.g., *Orobanche fasciculata* - clustered broom-rape).
- the grasslands are maintained because of geomorphology, low precipitation and winds of the area.

5. Kennedy Coulee

- established October 22, 1987.
- 10.68 km² in area.
- representative of the native ecosystems of the Mixed Grassland subregion of the Grassland Natural Region including: blue-gamma-wheatgrass-speargrass grasslands, ponds, alkaline wetlands and coulees with aspen woodlands.
- contains special features including: springs, rare plants (e.g., cushion everlasting), nesting ferrugi-

nous hawks, populations of species peripheral to Alberta (e.g., olive-backed pocket mouse, short-horned lizard, shrubby evening primrose).

- borders the Canada-U.S. boundary.

6. Athabasca Dunes

- established June 25, 1987.
- 37.69 km² in area.
- representative of the native ecosystems of the Athabasca Plain subregion of the Canadian Shield Natural Region including: active and stabilized sand dunes, jackpine-aspen woodlands and jackpine-black spruce dry bogs.
- contains special features including: kame deposits, active sand-grass communities, one large active transverse dune.
- the dunes were created through glacial and wind action on sandstone and granite.

7. Hand Hills

- established January 14, 1988.
- 22.29 km² in area.
- representative of the native ecosystems of the Northern Fescue subregion of the Grassland Natural Region including: fescue grassland communities, alkaline seepage areas, seasonal sloughs, moist meadows and aspen woodland.
- contains special features including: nesting habitat for the endangered piping plover, populations of upland sandpipers and thirteen-lined ground squirrels and rare plants (e.g., crowfoot violet, yellow evening primrose).
- several steep-sided drainage valleys cut through the area.
- a system of high rolling hills are present in the southern portion.

8. Wainwright Dunes

- established January 14, 1988.
- 28.21 km² in area
- representative of the native ecosystems of the Central subregion of the Parkland Natural Region including: aspen groves, speargrass-rough fescue grasslands and stabilized sand dunes.
- contains special features including: a sloping fen, springs, dune "blowouts," species at the southern end of their range (e.g., red squirrels, ovenbirds, American redstarts) and uncommon plants (e.g., showy everlasting and oblong-leaved sundew).
- the reserve contains dunes up to 30 m high.
- the area includes a unique mixture of southern grasslands, boreal forest and parkland vegetation types.

9. Marshybank

- established June 25, 1987.
- 8.29 km² in area.
- representative of the native ecosystems of the Main subregion of the Foothills Natural Region including: pine-feathermoss forests, pine-spruce forests, peatlands, sedge fens and meadows.
- contains special features including: marl pools, slumps and rare plants (e.g., Greenland primrose).
- the reserve contains two distinct biophysical areas. The first is a terrace-like lowland of lodgepole pine, black spruce fens and willow/birch wetlands. The second is an area of extensive bedrock ridges with young lodgepole pine growing amidst mature stands of Engelmann spruce.

10. Whitemud Falls

- established June 25, 1987.
- 8.64 km² in area.
- representative of the native ecosystems of the Mixedwood subregion of the Boreal Forest Natural Region including: spruce-aspen forests, pine-lichen woodlands, grass-sedge meadows and willow shrublands.
- contains special features including: rare plants (e.g., *Eupatorium maculatum*), a 30-m waterfall, gorges, rapids, caves, cliffs, 25-m dolomite stacks and a small dune field.

11. Upper Bob Creek

- established February 16, 1989.
- 26 km² in area.
- representative of the native ecosystems of the Montane subregion of the Rocky Mountain Natural Region including: Douglas fir forests, Douglas fir-limber pine forests, aspen forests, fescue-oatgrass grasslands and willow shrublands.

- contains special features including: north-south ridges, rare plants (e.g., *Oryzopsis exigua* - a species of rice grass), populations of hoary marmots, golden-mantled ground squirrels and lazuli buntings, and an elk wintering range.

12. Rumsey

- established September 13, 1990.
- 34.32 km² in area.
- representative of the native ecosystems of the Central subregion of the Parkland Natural Region including: aspen groves, fescue grassland, alkaline meadows, wet meadows and ponds and silverberry/buckbrush plant communities.
- contains special features including: esker-like ridges, ungrazed fescue grassland, rare mammals (e.g., prairie vole), uncommon birds (e.g., Baird's sparrow, Upland sandpiper) and uncommon plants (e.g., *Oxytropis deflexa* - reflexed loco-weed, *Scolochloa festucacea* - link grass).
- the reserve contains a significant parcel of the largest remaining example of aspen parkland ecosystem in Canada.

13. Plateau Mountain

- established December 12, 1992.
- 23 km² in area.
- representative of the native ecosystems of the Alpine/Subalpine subregion of the Rocky Mountain Natural Region including: lodgepole pine forests, Engelmann spruce and subalpine fir forests, krummholz, alpine meadows and lichen/sedge tundra.
- contains special features including: permafrost and patterened ground features, cave systems including an internationally recognized ice cave, kobresia tundra and several rare plans (e.g., *Agropyron scribneri* - Scribner's wheatgrass, *Senecio conterminus* - arctic butterweed, *Pedicularis flammea* - flame-colored lousewort, *Lewisia pygmaea* - dwarf bitterroot), populations of hoary marmots, golden-mantled ground squirrels, pikas, water pipits, white-tailed ptarmigan, blue grouse, gray-crowned rosy finches and 40 species of butterflies and skippers.
- the reserve contains critical winter habitat for Rocky Mountain bighorn sheep.

Appendix D

Alberta's Wilderness Areas

SOURCE: Alberta Tourism, Parks and Recreation brochures on Ghost River Wilderness Area, Siffleur Wilderness and White Goat Wilderness.

Alberta's three wilderness areas cover approximately 1,010 km^2 of rugged alpine terrain. Administered by Alberta Tourism, Parks and Recreation, they were established in the 1960s to protect the unspoiled beauty of the region's mountains, valleys and streams.

The wilderness areas offer visitors the challenge and solitude of an undisturbed natural setting. To ensure that this beautiful but fragile heritage will be available for others to enjoy in the future, these regulations to help preserve the area are in effect:

- Visitors may travel on foot only. No mechanized vehicles, horses or pack animals are permitted.
- Hunting, fishing and trapping are prohibited.
- All litter, garbage and refuse must be packed out. Body wastes should be buried at least 60 m from any water source.
- Landing of any type of aircraft is prohibited.
- Collection, destruction or removal of any plant or animal life (including birds' eggs) is prohibited without the written authorization of the Minister of Tourism, Parks and Recreation. This ban also applies to the excavation of fossils or other objects of geological, ethnological, historical or scientific interest.
- Introduction, deposition or addition of any material or substance that is, or may be, harmful to plant or animal life is forbidden.
- No construction, reconstruction or addition is permitted, nor any act that will disturb or alter the surface of a wilderness area.

Backpacking and camping are the most common forms of recreation in Alberta's wilderness areas. Visitors enjoy mountain climbing, nature photography, and—in season—snowshoeing and cross-country skiing.

Ghost River Wilderness Area

Topography and Geology

The 153-km^2 Ghost River Wilderness Area consists of rugged mountainous terrain and large glaciated valleys. It is ringed by high mountains (e.g., Mts. Aylmer, Apparition, Oliver and Costigan) in the range of 2,743 to 3,353 m. The flat, alluvial floor of the Ghost River valley is characterized by gravelly stretches. Tributaries to the Ghost River are within steep gorges and there are numerous waterfalls. Cirques, ice-sculptured bedrock, hanging valleys and moraine ridges are evidence of past glacial activity.

The Ghost River Wilderness Area lies mainly east of the Palliser Range of the Rocky Mountain front ranges. The Ghost River flows southeasterly along a syncline containing Mesozoic sandstone and siltstone beds dating back 20 million years. East of the Ghost River, the mountains are mainly massive cliff-forming limestones and dolomites of Mississippian age (as old as 250 million years), with older Paleozoic Cambrian beds (dating back nearly 600 million years) on the wilderness area's eastern boundary. The bedrock is made up of strata of various hardnesses that erode at different rates; the asymmmetry of the Ghost River valley is thus explained—a hard limestone layer forms the east flank of the valley, producing steeper, more sharply etched slopes than are found on the west side of the valley. Rock-banding can be seen in layered bedrock exposures. Most of the areas above treeline consist of unvegetated exposed bedrock and rocky alpine soils, interrupted by deposits of talus and large landslides.

Vegetation

Two zones of vegetation are distinguishable in the Ghost River Wilderness Area. Below the 2,100-m level is the subalpine coniferous forest of white and Engelmann spruce, fir and lodgepole pine. At lower elevations there are scattered stands of aspen, balsam poplar and birch. Understory plants include heather, gooseberry, twin-flower and bunchberry.

Above 2,100 m the climate is too severe for trees to survive, but during midsummer, alpine meadows on the slopes come to life with a carpet of such flowers as cinquefoil, glacier lilies, buttercups, anemones and Indian paintbrush. Hardy grasses and sedges also grow there.

Between these two zones lies a transitional area known as elfin woodland for the dwarfed, gnarled and wind-pruned fir and spruce that share the area with juniper, bearberry, mountain avens and willow.

The location of the Ghost River Wilderness Area within the southern front ranges has resulted in some special floristic and vegetational features not common to similar, yet nearby, mountain areas such as Banff National Park and the White Goat and Siffleur wilderness areas. The differences may be directly attributed to soil and climatic factors. For instance, the Ghost River Wilderness Area apparently contains more species of calcium-loving plants.

Wildlife

The Ghost River Wilderness Area provides extensive wintering range for bighorn sheep; it is also an important habitat for mountain goats. Other mammals include the wolf, mountain lion, coyote, elk, grizzly and black bear, wolverine and marten. Smaller rodents include the pika, marmot, red squirrel, golden-mantled and northern flying squirrels, porcupine and chipmunk; pack rats may also be found in elfin woodland.

Subalpine birds include the gray jay (whisky jack), spruce grouse, waxwing, yellow warbler, yellow-rumped warbler, pine siskin, Clarke's nutcracker, rufous hummingbird, golden eagle (also found in alpine areas) and mountain bluebird. Alpine bird species include the white-tailed ptarmigan, horned lark, blue grouse, rosy finch (also found in elfin woodland) and water pipit. Around lakes and streams, the goldeneye, dipper, spotted sandpiper and solitary sandpiper may be observed.

Butterflies are common in alpine meadows and other suitable habitats where caterpillar food sources are present: species include the red and white admiral, silvery blue, tortoiseshell, fritillary, checkerspot and sulphur.

Siffleur Wilderness Area

Topography and Geology

The 421-km² Siffleur Wilderness Area is part of the front ranges of the Rocky Mountains. It consists of a series of high peaks with elevations as high as 3,358 m separated by picturesque valleys. The area also contains other interesting features including hanging glaciers, mountain lakes and tarns, and alpine meadows. The bedrock includes quartzite, limestone, shale and dolomite. Some of these originated in the late Precambrian era of close to a billion years ago.

Vegetation

The vegetation of the Siffleur Wilderness Area is very similar to that of the Ghost River Wilderness Area (see above). A major fire in 1974 burned about 26 km² of subalpine forest in the Siffleur/Escarpment River area, and stands of very immature lodgepole pine are now being reestablished.

Wildlife

A profusion of wildlife can be seen in the river valleys and on the lower slopes of the Siffleur Wilderness Area. This includes such large animals as moose, elk, white-tailed and mule deer, caribou, grizzly and black bears, mountain lions, wolves, coyotes and wolverines. Smaller mammals are represented by several species—squirrels, chipmunks, martens, porcupines and marmots. Alpine areas are inhabited by mountain goats, golden-mantled squirrels, marmots and pikas. Pack rats can be found in the transitional elfin woodland. Bighorn sheep can be observed in all of these areas.

Subalpine birds in the Siffleur area include the spruce grouse, whisky jack, waxwing, yellow warbler, pine siskin, Clarke's nutcracker, rufous hummingbird, mountain bluebird and yellow-rumped warbler. Around lakes and streams there are goldeneye, dipper and sandpiper. Alpine species are represented by the ptarmigan, rosy finch, water pipit, blue grouse and horned lark. Bald eagles range throughout the wilderness area.

White Goat Wilderness Area

The 445-km^2 White Goat Wilderness has similar topography and geology to the Siffleur, with peaks up to 3,313 m separated by wide valleys. The area also contains a number of alpine meadows. Its vegetation and wildlife are also similar to those of the Siffleur (see above).

Appendix E

Distribution of Protected Areas in Alberta, by Size

Table E-1
Alberta's Protected Areas, Ranked by Size of Protected Area (greater than 10 km^2)

Area Size (km^2)	**Site Type**	**NAME**	**Natural Region:** Subregion
10	Restricted Develop. Area	Cap. City Pk.	**Parkland:** Central
11	Ecological Reserve	Kennedy Coulee	**Grassland:** Mixed
11	Migratory Bird Sanct.	Saskatoon Lk.	**Parkland:** Peace River
11	Provincial Park	Young's Point	**Boreal Forest:** Mixedwood
12	Ecological Reserve	Goose Mountain	**Foothills:** Northern Outliers
12	Provincial Park	Carson-Pegasus	**Boreal Forest:** Mixedwood
12	Provincial Park	Dry Island	**Parkland:** Central
12	Provincial Park	Fish Creek	**Grassland:** Foothills & **Parkland:** Foothills
12	Provincial Park	Winagami	**Boreal Forest:** Mixedwood
13	Provincial Park	Bow Valley	**Rocky Mountain:** Montane
14	Natural Area	Pine Sands	**Boreal Forest:** Mixedwood
15	Provincial Park	Whitney Lakes	**Boreal Forest:** Mixedwood
16	Forest Recreation Area	Gunderson Mead.	**Foothills:** Main
16	Game Bird Sanctuary	Miquelon	**Parkland:** Central
17	Provincial Park	Writing-on-Stone	**Grassland:** Mixed
18	Ecological Reserve	Silver Valley	**Parkland:** Peace River
18	Natural Area	Redwater	**Boreal Forest:** Mixedwood
21	Natural Area	White Earth Val.	**Boreal Forest:** Mixedwood
21	Provincial Park	Cross Lake	**Boreal Forest:** Mixedwood
22	Ecological Reserve	Hand Hills	**Grassland:** Northern Fescue
22	Habitat Develop. Area	Antelope Ck.	**Grassland:** Mixed
22	Restricted Develop. Area	Frank Slide	**Rocky Mountain:** Montane
23	Provincial Park	Hilliard's Bay	**Boreal Forest:**Mixedwood
26	Ecological Reserve	Upper Bob Ck.	**Rocky Mountain:** Montane
27	Provincial Park	William A. Swit	**Foothills:** Main
28	Ecological Reserve	Wainwright	**Parkland:** Central
29	Game Bird Sanctuary	Birch Lake	**Parkland:** Central
30	Restricted Develop. Area	Edm.-Devon	**Parkland:** Central
32	Ecological Reserve	Kootenay Plains	**Rocky Mountain:** Montane
32	Restricted Develop. Area	Edm.-Ft.Sask	**Parkland:** Central
34	Game Bird Sanctuary	Many Island	**Grassland:** Mixed
34	Ecological Reserve	Rumsey	**Grassland:** Northern Fescue
34	Provincial Park	Crimson Lake	**Foothills:** Main
38	Ecological Reserve	Athab. Dunes	**Canadian Shield:** AthabascaPlain
55	Natural Area	Milk River	**Grassland: Mixed**
57	Natural Area	Beehive	**Rocky Mountain:** Subalpine/Alpine

Table E-1 (continued)
Alberta's Protected Areas, Ranked by Size of Protected Area (greater than 10 km^2)

Area Size (km^2)	**Site Type**	**NAME**	**Natural Region:** Subregion
58	Wildlife Sanctuary	Sheep River	**Parkland** : Foothills
66	Provincial Park	Dinosaur	**Grassland:** Mixed
73	Game Bird Sanctuary	Ministik	**Parkland:** Central
76	Provincial Park	Lesser Slave	**Boreal Forest**: Mixedwood & **Foothills**: Northern Outliers
77	Restricted Develop. Area	Calgary	**Parkland**: Foothills
97	Provincial Park	Notikewin	**Boreal Forest**: Mixedwood
97	Provincial Rec. Area	Blackfoot	**Parkland:** Central
110	Wildlife Sanctuary	Camp 1	**Foothills:** Main
115	Game Bird Sanctuary	Pakowki	**Grassland**: Mixed
117	Game Bird Sanctuary	Richardson	**Boreal Forest**: Peace R. Lowlands
127	Migratory Bird Sanctuary	Richardson	**Boreal Forest**: Peace R. Lowlands
147	Provincial Park	Lakeland	**Boreal Forest**: Mixedwood
153	Wilderness Area	Ghost River	**Rocky Mountain:** Subalpine/Alpine
195	National Park	Elk Island	**Parkland:** Central & **Boreal Forest:** Mixedwood
205	Provincial Park	Cypress	**Rocky Mountain:** Montane & **Grassland:** Mixed
239	Game Bird Sanctuary	Lac La Biche	**Boreal Forest:** Mixedwood
412	Wilderness Area	Siffleur	**Rocky Mountain:** Subalpine/Alpine
441	Provincial Rec. Area	Lakeland	**Boreal Forest**: Mixedwood
445	Wilderness Area	White Goat	**Rocky Mountain:** Subalpine/Alpine
501	Provincial Park	Peter Lougheed	**Rocky Mountain:** Subalpine/Alpine
525	National Park	Waterton	**Rocky Mountain:** Montane & Subalpine/Alpine
4597	Willmore Wilderness Park		**Rocky Mountain:** Subalpine/Alpine